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ORIGINAL COMMUNICATIONS.

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TINNITUS AURIUM. SOME REMARKS ON ITS CAUSE AND TREATMENT.*

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Mr. Chairman and Gentlemen:

Every member of this section is proud, and justly so, of the scientific progress made in the department of Otology during the last twenty-five years.

It is probably true that this is equal, or exceeds that made by any kindred branch of medicine in the same time. Not merely has our ability to restore lost hearing been greatly increased, but brilliant results have been secured in the incalculably more important realm of life-saving. Amid this general advance, possibly because of its less importance, possibly because of its obscure nature, one symptom seems to have received little or no recognition, and yet what more annoying or distressing symptom do we have to contend with? Who of us has not been pushed to his wits end to give relief to some intractable case of Tinnitus?

It is not with the hope of offering any new thoughts on this subject that this paper is presented, but rather to serve, if it may, to stimulate investigation and call forth a general interchange of views.

The literature upon noises in the ear is surprisingly limited. Politzer's article still remains one of the most complete and au-

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thoritative. Urbantschitsch and Hartmann have contributed valuable articles in their respective books. The subject is not referred to except incidentally in Schwartz's system, nor in Gruber's excellent treatise. In recent years Randolph, Bishop and Gomez have contributed to the subject. Finally, Panse has published within a year an article in the Archives of Otology which shows much care and study.

Frequency.—We are all aware of the frequency of tinnitus in aural disease. As a rule it accompanies or precedes every case at some stage of the disease. In a study of the subject made by the writer some years ago it was found that in 824 cases recorded, there were 321 cases of tinnitus (about 37 per cent). These were divided as follows:

Impacted Cerumen	51 cases
O. M. Chronica Catarrhalis	97 cases
O. M. Chronica Catarrhalis Adhesiva	15 cases
O. M. Suppurativa Chronica	30 cases
Otitis Interna	26 cases
Mixed Disease	44 cases
Foreign Body	1 case
Otitis Externa	5 cases
Eustachian Catarrh	2 cases
Otitis Media Acuta	50 cases

321 cases

This percentage is probably too small.* Politzer estimates that tinnitus is found in two-thirds of all ear diseases. How widely this varies in character, intensity and frequency is equally well known. It is scarcely to be doubted that the agony from it has been so great in certain cases that insanity or suicide was imminent, if not actually occurring.

At the outset a proper classification of noises in the ear is essential; without it we cannot look for any satisfactory means for their relief. That tinnitus is not due to any one single cause is now thoroughly well understood. A division then according to the more common etiological factors seems the most rational. The plan of designating tinnitus according to the particular sound it resembles is obviously unscientific. We may say, then, following Hartmann, that all or most cases of tinnitus are due to one of two generic causes—either to some lesion or interference with the function of the sound-perceiving apparatus, the labyrinth, nerve or

brain centre, or to some lesion or other causes interfering with the sound-conducting apparatus.

To the first is given the name of Subjective Tinnitus; to the second Entotic Tinnitus. There is still a class of cases which may be referred to as Objective or Reflex Tinnitus.

Tinnitus resulting from some interference with the normal conduction of sound represents by far the larger number of cases. Panse has gone into this very fully in the article previously referred to. The middle ear is in intimate relation to the large blood vessels of the head, especially the lateral sinus and the internal carotid. Through these channels and others, a continual coursing of blood is taking place; this without question gives rise to constant venous and arterial sounds. The only wonder is that they are not always heard and the only explanation that we are not all sufferers from this is that in the healthy ear there exist unimpeded exits for the sounds. How easily this normal condition can be affected, anyone can quickly satisfy himself by pressing firmly upon the tragus.

Any obstruction at all to the transmission of sound, whether in the middle ear, Eustachian tube or auditory canal, is sufficient to produce tinnitus. A sound which is so feeble as to be lost in the open air is easily heard in a small room; so a blood sound lost by dissipation of sound waves is perceived when these waves are interfered with. Bezold has shown that in pure middle ear disease the low sounds are alone impaired or lost, and Rinne and Schwabach's classical laws of the intensifying of these low sounds by bone conduction are in daily use. The high notes are much less intensified by such interference; indeed, Panse believes that for the perception of the high sounds the ossicular chain is not necessary.

Cases of tinnitus due to some interference with the sound waves represent by far the largest group we meet with. They include the various forms of obstruction to the Eustachian tube, obstruction to the external auditory canal by impacted cerumen, foreign body or inflammation and, as pure types, purulent disease of the middle ear. Here also belong many cases of catarrhal disease of the middle ear. There is a group of cases closely allied to these cases and yet differing clearly from them in origin. This is the class which is known variously as reflex or objective tinnitus. It offers continual interest to the otologist. It occurs in people with

normal hearing. We are usually led to regard tinnitus as a sign for approaching deafness. In these cases the tinnitus has existed possibly for years with no impairment of hearing. Occasionally the sounds are so loud as to be heard by an observer at a distance. These cases are usually due to some muscular spasm or external or nervous stimulation or anomaly. The muscular spasm may be in the tensor tympani, the stapedius, the tubal muscles or even those of the palate.

Cases too are reported of tinnitus due to contraction of some facial muscle through the trigeminal nerve acting on the stapedius. Again, tinnitus has been shown post mortem in one case to be due to the anomalous course of the stylomastoid artery, which ran between the branches of the stapes.

Any strong emotion or any long continued exertion may produce temporary noises in the ear. Allied to this are disturbed circulatory conditions as a result of organic heart, liver or kidney disease, or anemia.

Some persistent nervous noises have been shown to be due to an aneurism in the blood vessels adjacent to the ear. In these latter cases the conduction is normal, but the sound is intensified. Some of these reflex cases cannot be regarded either as muscular or nervous, and without much question fall into the class described by Politzer as nerve tinnitus, etc. Here an excitation of the auditory nerve exists.

Subjective Tinnitus.—This may properly include cases of noises in the ear where no reflex cause exists and all interference with the sound conduction is excluded.

In some instances the labyrinth, auditory nerve or nerve centre is directly involved; in many others there is a sharing in the difficulty with the middle ear in the sclerosis and ankyloses round the stapes and oval window. Doubtless in certain cases disturbance of inter-labyrinth pressure is the condition present.

As instances of tinnitus the nature of which is not fully understood, may be mentioned voluntary noises. Hartmann mentions his ability to produce an audible sound at will. This is probably muscular, either from the tensor tympani or the tubal or palate muscles.

Occasionally cases are met where the sound resembles melodies or human voices. A case of this kind is now under the care of

the writer. He is an epileptic who always hears human voices as the aura preceding the attack. These are regarded by Politzer and others to be indicative of threatened insanity.

Diagnosis.—The diagnosis of noises in regard to their source is intimately associated with the prognosis and treatment. Many cases permit of exact localization; in other instances it is impossible, but every case demands to be carefully investigated.

Our usual method of recording tinnitus in our note books and then stopping, will not suffice. As has been shown, the tinnitus may be due directly or reflexly to almost any condition of the body.

The examination includes, then, every method we employ for a most careful testing of the hearing. We satisfy ourselves of the condition of the drum membrane, the mobility of the ossicles, the patency of the Eustachian tube, condition of the throat and nose. The tuning forks reveal the pitch of the noise. Panse has laid stress upon this and believes that in all cases of pure conduction interference the sound will be low, C, C/, or rarely C₁₁, while subjective tinnitus is always high pitched. It is questionable if this is not too sweeping an assertion, and yet in general it may be regarded as a good rule to follow. Examination of nose and nasopharynx is never to be omitted and in persistent tinnitus long continued, an inquiry into possible organic disease, whether of heart, stomach or liver, is in order as well as an examination into the blood condition.

The particular form the sound assumes is not of great importance. The number of sounds reported is myriad. It is usually the pulsating form which is met in acute disease. This is always arterial or venous. These are the sounds which are always due to interference with sound conduction. Their nature can be in many instances determined by pressure on the blood vessels of the neck, when they disappear for the time being. Hissing sound as of steam escaping, which represents a large number of cases of catarrhal deafness, is indicative probably of labyrinthine involvement.

Prognosis.—The outlook for persons suffering from continuous tinnitus, especially after it has existed any length of time, is not a particularly bright one. In many instances it will continue for a lifetime.

Fortunately, as a rule habit steps in and the patient becomes accustomed to it and suffers much less in consequence, yet the result of treatment is not so unfavorable as is often supposed. Of the 321 cases of tinnitus previously mentioned 137 underwent treatment. Of these 58 were cured, 46 improved, 33 not improved. This is by no means a hopeless prospect. Important in the prognosis is whether the sound is intermitted or continuous, whether it varies in its intensity and especially what the pitch is. Many cases of sound conduction tinnitus can be relieved if the obstruction that exists is in the Eustachian tube or auditory canal, and it is possible to overcome this.

Tinnitus due to sclerosis in the middle and internal ear disappears often of itself after a time. While, it is true, tinnitus is in many instances the premonitory symptom of approaching deafness, we have already stated this is not always the case. Randall, in an interesting communication read before the American Otological Society, cites his own case. He has had persistent tinnitus for years without defective hearing, due, as he believes, not to some muscle contraction, but to the separation of the moist and sticky surfaces of the Eustachian tube.

Finally it must not be forgotten that the intensity of the noise may vary according to various conditions of the weather. Temporary functional condition of the general system will influence the degree of noise.

Treatment.—What do you do for noise in the ear, is a question so often asked by the aurist. The reply should be: There is no single remedy; every case is to be individually examined, the character, situation, cause of the noise, to be determined as carefully as possible, and then the proper means employed to relieve the cause so far as we may. Many times treatment to nose and throat will suffice. Carmalt Jones has secured good results from turbinectomy. To illustrate a common form: Examination reveals a low-pitched noise in a person with advancing deafness, a retracted drum, loss or diminution of sound for low forks and a diminished patency of Eustachian tube; the case is one of probable middle ear catarrh with a conduction sound tinnitus. Here local treatment alone is called for and will often give entire relief. The Politzer method of inflation is the one commonly used. This is to the mind of many aurists not sufficiently exact and much

greater weight is attached to the use of the catheter with the diagnostic tube. The diagnostic tube is an important auxiliary. By it the patency of the Eustachian tube can alone be accurately determined.

The tube sound in diminished patency is characteristic, being in a stenosis of the tube with a stricture of its isthmus, very small and high pitched.

Many cases will not yield, however, to the air inflation. The narrowing has become too much organized. Here systematic dilatation with graded sizes of whalebone or celluloid bougies, as recommended by Urbantschitch, has accomplished brilliant results. Re-established patency means in such results release on (abnormal) resistance to sound waves. It may be said then that every case of high-pitched inflation sound should be tested with the bougie for a possible stricture. This stricture is wont to occur most often at the isthmus of the tube where the bone and cartilages meet.

The bougieing is, however, too often but a temporary means of dilating the stricture and relieving the tinnitus. As a substitute and method which promises a decided advance, is the use of Electrolysis, suggested some years ago by Newman, but recently brought forward again in this country by Duel. In this procedure the stricture is not merely dilated but by use of the negative current it is permanently dissolved. Duel has reported excellent results as regard strictures by its use.

It is too early to venture more than an opinion. The method is being tested by many aurists, and seems to promise much. The electrolysis is accomplished by fine gold bougies in rubber or rubber-wound silver catheters. The current is carefully adjusted by means of a milliammeter, and usually not more than two or three milliamperes are used.

Other cases of middle ear tinnitus are dependent directly on adhesive changes in the middle ear itself and can be relieved by the use of massage to the ossicles and drum membranes. The simplest method is by means of Delstanche's masseur, or that known as the Siegle otoscope, and often they are insufficient,—working somewhat on the same principle. Several aurists have adopted electricity, producing electrical massage in the form of a very rapid vibration. Much was expected from it, and at first the results were very often gratifying. They were in our experience

and that of most aurists, however, only transient and the vibrometer has, we believe, been pretty generally abandoned. Electricity, especially the Galvanic current, has been strongly recommended by some aurists. Jones states that he has succeeded in relieving a large number of cases of tinnitus, at least one-third by the use of this current. The kathode is placed over the ear by means of an adapted binaural stethoscope. The relief, if produceable, will be met at the first treatment. It must be frankly said that his experience is at variance with that of most observers, including the writer. We have yet to see a case where electricity seemed to help, yet in cases where all else has failed, the procedure is simple and it should certainly be tried. Of operative procedure little is to be said. It is almost universally agreed that operation for tinnitus is rarely warranted. Where tinnitus is associated with retraction of malleus and the cause of the tinnitus is in all probability due to a tightening tensor tympani, tenotomy of this tendon is permissible and will give at least temporary relief if the diagnosis proves correct.

Seiss, of Philadelphia, has reported favorable results in tinnitus due to sclerosis of the middle ear from two methods, the application of ethyl chloral to the mastoid and the introduction of warm albolene and menthol into the middle ear per tuba. We regret to say that in a limited number of cases, where we gave both methods careful trial, we got no success.

Where our examination shows no evidence of interference with sound waves and when all local measures prove futile, we are forced to resort to internal medication to relieve the tinnitus.

The therapeutic treatment of tinnitus is to-day exceedingly unsatisfactory. Clear indications for the use of a certain class of drugs are lacking. To a large extent we are compelled to grope in the dark. Direct nerve depressants or sedatives would seem to be called for, and probably are most useful in the majority of cases. In a certain number of limited cases arterial depressants will do good, as enumeration of all the drugs employed by different observers would almost exhaust the pharmacopeia. In many instances the result of the use of the drug is not mentioned, or success has been observed in only a single case. We shall confine ourselves to what have been carefully reported or what we have used ourselves.

These in the order of frequency with which we have prescribed, are:

Strychnine,
Iodide of Potash,
Nitro-glycerine,
Tinc. Gelsemium,
Bromide of Potash,
Tinc. Digitalis.

Strychnine Sulphate in one-sixtieth grain doses before meals gave the best results which are not brilliant. In every case the question of sound wave interference had been previously enumerated. It was used in 17 cases; all but one pure on chronic catarrh or mixed disease. Relief greater or less and in some instances only temporary, was obtained in 7, or 41 per cent.

Iodide of Potash was prescribed in three cases of chronic diseases of the internal ear, with relief in all, and two cases of acute trouble with equal success, while in eight cases of mixed disease there was relief in only two, or twenty-five per cent.

Nitroglycerine was given in several cases with high tension of arterioles. It was often necessary to give large doses, sometimes as high as 20 minims in the day, in order to produce decided physiological results. In at least two cases the effect on the tinnitus was flattering, but naturally the large dose could not be continued. With digitalis, on the other hand, tried where there was a clear nervous or arterial tinnitus, our results were uniformly disappointing. In every instance the drug disarranged the stomach without influencing the noise, so that we have now abandoned its use.

Tincture Gelsemium.—We began using this drug some five years ago, and have employed it in a number of cases, at times with good results. We are not prepared to make too strong a claim for its value and yet the results certainly warrant making use of it, where strychnine has failed. The drug is a spinal depressant and has no decided action on the heart.

In ten cases where it was given there was relief of more or less permanence to five. All of these improved cases were cases of middle ear disease. The drug failed totally in cases of internal disease.

Our experience with aconite, atropine and arsenic has been very limited and totally negative. Bromide of potash so generally

recommended either as the salt or in the form of hydrobromic acid, has been extensively employed as a dernier resort, but without a single exception has proved a disappointment.

Some years ago Blake recommended small doses of quinine frequently repeated. In a single case where it was given and all else had failed, it seemed to give some relief. It has been previously stated that any condition of the general system will have its effect on the noise. We have been wont in associated involvement of the alimentary canal to prescribe salines or saline mineral waters with good results.

Gomez some years ago recommended conium in the form of the alkaloid. He reported a series of cases with excellent results. We have used it recently in a number of cases, but we regret to say without any beneficial results, unless in one case.

Mention should be made of the use of hot air introduced into the middle ear, as recommended by Vansant. Finally it may be of interest to refer to the use of suprarenal extract. Dr. W. H. Bates has used it in over 200 cases with variable results, best in acute cases.

CONCLUSIONS.

1. Tinnitus is a very common and annoying symptom in ear disease.
2. Its origin is not thoroughly understood, but in many cases it is due to interference of sound waves.
3. It does not always mean deafness.
4. Much can often be done for it if the exact cause can be discovered.
5. Drugs are very disappointing in its treatment. Strychnine seems to give best results where local treatment has failed.
6. Careful study and recording of cases is essential to arrive at a proper understanding of the subject.

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EAR COMPLICATIONS AND SEQUELAE OF INFLUENZA.*

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Perhaps the most frequent localized inflammatory conditions secondary to influenza are the acute invasions of the Eustachian tube and middle ear cavity.

Statistics and repeated clinical evidence substantiate the fact that over 70 per cent of all acute inflammatory affections of the middle ear cavity result from previous affections or infections of pharynx or naso-pharynx. This is especially true of all acute foci dependent upon infection by a pathogenic micro-organism. The tonsils and the lateral walls of the naso-pharynx seem to be unusually favorable points of attack, and by virtue of the continuity and similarity in structure of the mucous membrane lining these parts of the upper respiratory tract are extended through the Eustachian tubes to the tympanic cavity and its accessory spaces, the frequency of these ear sequelae is logically explained.

On the virulence and character, then, of the pharyngeal and faucial infection depends the intensity and rapidity of such aural complications. So in simple tonsillitis either follicular or parenchymatous, in whooping-cough and in acute pharyngeal infections where the accompanying micro-organism is not especially virulent, extension through the Eustachian tube and middle ear tract is less common. In diphtheria and scarlet fever, where an especially active invasion of the pharyngeal tissues takes place, ear complications occur with much greater frequency. It is in Influenza, especially of the epidemic type, which usually attacks the nasal and post-nasal areas suddenly and viciously, that the most rapid involvement of the ear ensues. Clinically a severe coryza may call forth similar inflammatory conditions of the ear, but rarely with the same intensity and penetration of the tissues as that form produced by Influenza, which we term "the grippe ear."

The rapid onset of an Influenza infection, no matter what portion of the respiratory tract is involved, is clinically well known,

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as is also the treacherous character of the pathogenic micro-organism responsible for this infection. This is especially true in aural sequelae, for they usually occur suddenly and unexpectedly in the course of an Influenza attack.

The acute otitis media consequent upon a grippe infection is not usually of the simple catarrhal form, but rather ushered in by a symptom complex and an intensity and diffusion of pain about the ear which is at once characteristic of Influenza. The usual catarrhal otitis media beginning with ear ache, and congestion of the membrana tympani and the lining membrane of the tympanic cavity is a form common to all ear sequelae dependent on acute faucial or naso-pharyngeal inflammations; the sudden, intense, deep-seated pain, involving much of the temporal region, with rapid tenderness over the mastoid area and profuse serous effusion into the tympanic cavity, vertigo and persistent hemicrania are characteristic of "the grippe ear."

In simple catarrhal otitis media when the indications for paracentesis auris have been presented and a free drain has been established, pain and pressure-symptoms soon subside; in the "grippe ear" the relief of these symptoms is not always effected after paracentesis has been made and a free drainage secured. The persistency with which this train of symptoms is maintained in an Influenza ear presents a difficult problem in the therapeutics and surgery of this affection.

Anatomically the tympanic cavity proper, the attic, the antrum and mastoid cells are all lined with the same mucous membrane, and in the light of modern otology are now known to constitute the tympanic cavity in its entirety. When, therefore, the pathogenic invasion of the middle-ear cavity by Influenza occurs, it is reasonably assumed and clinically corroborated that such invasion attacks all of these accessory spaces of the middle ear cavity alike. This accounts therefore for the quick mastoiditis frequently occurring almost spontaneously with the onset of ear-ache.

To regard the "grippe ear" simply as an acute catarrhal otitis is to under-value the importance of the subject, the gravity of the affection, the rapidity of its invasion, and the oft-times serious consequences to the patient.

In no other form of acute inflammation in the field of otology, unless perhaps in that of mastoid abscess, is there such a variation

in symptomatology and indications for treatment. In many cases the treatment adopted in simple catarrhal otitis media will suffice to effect a cure.

Pre-eminent among all measures for the relief of acute inflammation of the middle ear cavity, especially where serous, bloody or purulent effusion has taken place, is paracentesis auris. Until recently the indication for paracentesis in such conditions has been that of a bulging membrana tympani. I will go one step further in this direction and urge the free and early incision of the drum membrane as soon as a definite diagnosis of "grippe ear" has been established. I do not wait for the results of thermal applications, either hot or cold, but establish a drain from the middle ear cavity at the outset. If the drum membrane is bulging as a result of effusion in the tympanic cavity, the more promptly we evacuate the contents of this cavity the better; if the drum membrane is retracted producing an interference of air equalization from within and consequent pain, paracentesis re-establishes this air balance. In either case free incision of the drum membrane is the first principle to be observed.

Much has been written of the comparative value of hot and cold applications. This question has been discussed not only in our field of otology, but in all branches of medicine, where acute inflammations require attention. It is generally conceded that in the earliest stages of mastoid inflammation the application of cold, either by the ice bag or Leiter's coil, is the most effective; in the later inflammatory stages heat, either by means of the hot water bottle, aural coil or irrigating douche, is frequently used.

To promote free drainage after paracentesis or spontaneous perforation I use the one-half inch selvedged gauze strip, either sterilized, carbolated or iodoform, packing the canal from fundus to meatus, and renewing the dressing whenever wet or saturated. In the early treatment of Influenza otitis, after free drainage has been secured, I rarely use any of the several forms of antiseptic powders, for no matter how perfectly soluble they may be, there is a possibility of choking up the small incision in the drum membrane through which the pus must be drained. Under no circumstances is Politzerization or inflation indicated in any stages of this affection.

To assist in evacuating the contents of the tympanic cavity

after paracentesis has been made I employ the Siegle otoscope, using only gentle suction, as a too vigorous application of this kind might bruise or injure the swollen tissues of the tympanum.

A condition which requires most careful attention and which I regret to observe is frequently neglected, is the treatment of the fauces and naso-pharynx. As the source of the trouble is usually located in these areas and as continued infection may result from inattention to such measures, active cleansing and medication should here be diligently carried out.

As Influenza is a constitutional invasion, the general treatment of the patient should be given every attention.

In the symptomatology of Influenza otitis one of the most treacherous conditions to cope with is the marked deafness, often beginning in the early stages and persisting until all other symptoms have subsided. Hearing tests with the watch and tuning-fork indicate that the form of deafness common to Influenza otitis is not that of an impaired conducting apparatus alone, but seems frequently to involve the labyrinth as well. In many cases in which careful tests have been made, I have found a marked diminution of bone conduction, thus proving the involvement of the labyrinth in this affection. It seems very plausible that in the extreme congestion of the entire mucosa of the ear the labyrinth should also be attacked. This important factor of marked deafness adds to the gravity of the affection and should direct us to a guarded prognosis as to the final restoration of hearing.

Another unusual condition which unexpectedly occurs in Influenza otitis is sudden deafness. During the past few years I have observed this neurosis in four or five cases. Sometimes in the early stages of the affection, sometimes in the third or fourth week of suppuration, the patient will suddenly experience that he is unable to hear with the affected ear. In three of such cases, which have come under my own observation, hearing tests were made soon after the occurrence of this symptom and nerve deafness diagnosed, as indicated by absence of air conduction and decided diminution of bone conduction for watch and tuning-fork.

I have one case of this character under treatment at present where all efforts to restore the hearing of the affected ear have thus far failed. I regard this condition distinctly as a grippé neurosis affecting the labyrinth.

Much could be said of the mastoid complications which are encountered in the course of Influenza otitis. With the vigorous onset of an Influenza otitis and the diffuse inflammation of the many pneumatic areas of the tympanic cavity we would expect to find a greater frequency of mastoid complications, but this is not verified by my own experience. In Influenza otitis the characteristic symptoms of the affection develop in such rapid succession that we have almost with the onset mastoid tenderness and sharp radiating pain extending from the mastoid to the occiput, vertex, eyes and teeth. I do not regard these symptoms, however, as characteristic of mastoid inflammation, but rather as a neuralgia so constant in Influenza of every type. In the simple acute or chronic suppurative otitis media with such symptoms, the radical aural surgeon might urge prompt operation; in Influenza otitis I have frequently subdued these symptoms by thermal applications and free tympanic drainage.

When the mastoid antrum and cells are actively attacked in the course of an Influenza infection of the ear the indications for the mastoid operation are so promptly and markedly developed that there is no doubt concerning the diagnosis or operative necessity.

To recapitulate then the main points of value in the conduct of Influenza otitis:

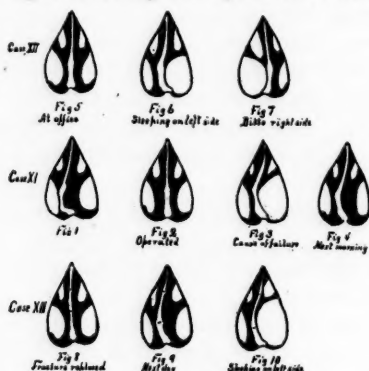
1. Epidemic or endemic Influenza is the etiological factor in this affection.
2. A careful differentiation should be made between simple otitis media and Influenza otitis.
3. Free incision of the drum membrane at the earliest indication of effusion into the tympanic cavity should be made. This free drainage should constitute the most important principle in the treatment of this affection.
4. A guarded prognosis should be given, especially as concerns the complete restoration of hearing.
5. Conservatism is urged concerning operative interference when mastoid symptoms appear, as many of these symptoms are accompaniments of Influenza and should be regarded as neuralgias rather than evidences of suppuration.

DEVIATION OF THE NASAL SEPTUM. WHY DO OUR CORRECTIVE OPERATIONS OFTEN FAIL?

BY CHEVALIER JACKSON, M. D., PITTSBURG, PA.

The interrogatory in the title may be answered thus: Because the surgeon has failed to remove a portion or all of the inferior turbinal from the concave side. This seems a novel and a radical statement, but let us consider the observations upon which it is based.

The first ten cases operated by the writer for septal deviation were, to a great extent, failures. The eleventh case (see diagram) was that of a neurasthenic young lady of eighteen. About two o'clock in the night following the operation I was called by the



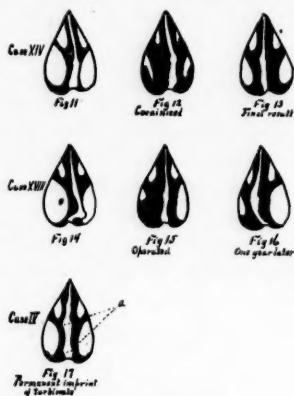
DIAGRAMMATIC.

parents on account of the restlessness and pain of the patient. These were due simply to the excitable, neurasthenic nature of the individual, and were readily quieted by a sedative. But the incident was the occasion of a discovery that was well worth my trouble. Quite incidentally I examined the nose and discovered the left inferior turbinal in the very act of pushing the straightened septum back into its old position of deflection as shown in Fig. 3. In the morning, when I saw the patient after being up and dressed, I found the left inferior turbinal, after having undone my careful

straightening of the septum, had shrunk to its usual size and appeared innocent of power for mischief. (Fig. 4.) This experience led to a careful investigation of the nocturnal behavior of the turbinals in the normal and the diseased nose. The results are embodied in this paper.

It is an often noted symptom that in hypertrophic rhinitis the nasal passage corresponding to the side lain upon (the "pillow side") becomes obstructed. When the patient turns, the other nasal passage opens, as the newly-turned-down side closes. This closing is due, as is well known, to swelling of the turbinal tissues incidental to hypostatic vascular engorgement in a relaxed vasomotor state. The blood channels are distended with blood, enlarging the turbinals until the entire nasal cavity is filled and the support of the rigid bony walls of the nasal chamber is reached. The bony walls will not yield to the pressure of the expanding mass, but the cartilaginous septum often does, especially in the young subject. But when the patient turns, if the opposite turbinal be of equal size and expanding capacity the reverse direction of pressure will push the septum back to the centre line, or even to an equal degree beyond. This is illustrated in the diagrammatic sketch of Case XII, a lad of eighteen. If one turbinal be smaller and less extensive in expansion than the other the septum will be pressed farther and more forcibly one way than the other and deflection will result. The large turbinal will grow larger, the small turbinal smaller. Again, if the patient sleep more on one side than the other the continual pressure of the engorged turbinal on the pillow side will result in permanent septal deviation. As the septum is pushed farther over, the turbinal follows by permanent enlargement due to hyperplastic deposits left at each night's engorgement like the alluvial deposits at each rise of the Nile. The hyperplasia is doubtless accelerated by an occasional acute coryza. This explains the pernicious tendency of the turbinal to fill the space left by the deflecting septum. It is not a physiological compensation. It is a pathological condition. The turbinal in thus taking up the increased space it makes for itself, behaves like a polypus, which we have all seen to have deflected the septum in its expansions. Yet at the time of inspection it is always freely movable and is not wedged tightly as one might expect from the deformity its increasing bulk produces. One of the

most convincing series of observations proving turbinal pressure to be an important etiological factor in septal deviation is this: Of twenty persons examined who habitually sleep on one side exclusively, eighteen (90 per cent) showed a deviation to the opposite side. Sixteen of these cases had hypertrophic rhinitis of various degrees of severity, four were normal; but all showed a permanent imprint where the septum was pressed upon, with more or less of a ridge or ecchondrosis anterior to the pressed area. These are so constant as to be often called normal. Case XIII was a football player of seventeen years, whose accidentally fractured septum I replaced carefully every day for three days, only to find each



DIAGRAMMATIC.

morning the right deviation shown at Fig. 9. Learning that he slept chiefly on his left side because of the offensive breath of his bedfellow, I determined to investigate. Inspection after an hour's sleep on the left side showed the condition sketched at Fig. 10. The turbinal was caught in flagrante delicto, undoing my work. There was no hypertrophic rhinitis in this case. The engorgement of the turbinal on the pillow side was due only to hypostatic congestion, which numerous observations convince the writer occurs in the normal as well as in the hypertrophic turbinal. In his early days the writer was confronted with Case XIV, Fig. 11. He cocaineized to examine and found the condition shown at Fig. 12. There seemed plenty of room to replace the septum.

He considered the condition one of soft hypertrophy, and, following the teachings of the day, applied the chemical and the equally useless electric cautery; then after healing proceeded with the septal operation. The immediate result was fair, but the patient returned two and one-half years later as badly obstructed as when first seen. (Fig. 11.) A radical right inferior turbinotomy, followed after healing by a Watson septal operation gave a perfect and permanent result as shown at Fig. 13, sketched three years later. In one case (XVIII) the writer obtained a very satisfactory result in a greatly deviated septum by a radical inferior turbinotomy on the concave side, followed, after healing, by the removal of a spur and a thorough breaking up of the resiliency of the septum with Sajous' forceps. This last operation was done just at the onset of the expected annual attack of "hay fever." The turgescence of the untouched inferior turbinal on the convex side pushed the septum over past the middle line and kept it there. (Fig. 16.) This is given for the lesson it teaches as to turbinal pressure in relation to septal deviation and the correction thereof. It is not a good example to follow for two reasons. First, at the onset of a vaso-motor coryza is an undesirable time to operate; second, the Sajous operation is not as good for this kind of deformity as the Watson or Watson-Gleason operation, neither of which were then devised. Case IV shows, in a practically normal nose, the permanent imprints (a, Fig. 16) of turbinal pressure during sleep. These imprints, with the ecchondroses and hypertrophies that mark the border of the imprint, including the septal tubercle, are so nearly constant as to be regarded almost as normal. They are due, in the writer's opinion, to turbinal pressure. Hypertrophies on the vomer posteriorly, due to the same cause, but not quite so constant, have been referred to in a former paper.¹ As there pointed out, it is useless to remove ecchondroses and hypertrophies of the septum and leave the swelling turbinals that cause them.

Now all the foregoing cases point clearly to the fact that great pressure is exerted periodically upon the septum by the turbinals during engorgement. As to the amount of this pressure mathematically expressed the writer is unable to give data. Anyone having time for laboratory work on the living human subject

¹Jour. Amer. Med. Assn., May 25, 1901.

can readily determine it experimentally. It must be many ounces to the square inch, estimating from the pressure necessary to indent with a probe the relaxed and swollen turbinal in coryza and "hay fever." Leaving this for the experimenter to determine, we have abundant clinical evidence, some of which is diagrammed here, to prove conclusively that the pressure is sufficient to produce a permanent deviation of the cartilaginous septum. When the rigidity of the bony septum is temporarily destroyed by accidental or operative fracture, deflection is quickly and easily accomplished by the powerful turbinal pressure. It might be argued against the ground here taken as to turbinal pressure being one cause of septal deviation, that the turbinal on the convex side could push as well as its fellow on the concave side, but it must be remembered that on the convex side the turbinal is small and often atrophied, while its fellow is large and hypertrophied and of greater vascularity, consequently both more extensive and powerful in its inflammatory and its passive nightly expansive excursions.

Now if the facts here set forth be accepted how shall we prevent the failure of our corrective operations? The writer's answer is: Precede every operation for deviation by a turbinectomy or very radical turbinotomy of the inferior turbinal on the concave side. (Rarely the middle turbinal will require operation also). If a turbinotomy be done, it must include a fringe of bone to bind down firmly the remaining tissue, and conservatism will lead to failure of the following septal operation. If the turbinal operation be sufficiently radical, there will be no need of a Mayer, Kyle or Asch tube, nor of packing, in the convex side to keep the septum in its new position. The last thirty consecutive cases operated by the writer (who is of indifferent operative ability), have been perfectly successful without any support whatever. The only things that could displace the limp replaced septa were eliminated when the preceeding radical turbinotomies were done. It might be argued that every case of septal deflection does not need a turbinectomy. It is thus the surgeon is deceived. There seems to be ample room to replace the septum, and yet leave sufficient space. Let the skeptic go at night while the patient sleeps with the concave side next to the pillow. He will find there is no room at all. The functions of the turbinals as far as we know them (warming, moistening and cleansing the inspired air) can only be performed when

there is a free channel for the passage of the inspired air. If the nostril be obstructed on one side by the deflected septum and on the other by the swollen turbinal the patient will sleep with his mouth open and the turbinals will be functionless. Anyway, if too much of the turbinal be removed it will grow again to a certain extent as seen in Fig. 16, where a very adequate turbinal was developed in one year from a stump. The writer is aware that the text books are opposed to him in this, most of them agreeing with Greville McDonald, who says that hypertrophy of the inferior turbinated body in these cases "Would appear to be a physiological attempt to compensate for the abnormal width of the fossa and should not lightly be interfered with." This is the foundation of failure in the correction of septal deviation.

The writer begs to sum up the following conclusions from his observations:

The turbinated bodies, in health and disease, swell at night during sleep, the swelling being greatest in the inferior, and on the side next to the pillow.

This periodical swelling, aided by the swelling incident to acute coryza, acute and chronic rhinitis, etc., is often an etiological factor primary or secondary, in septal deviation, both before and after operation, the deviation being usually of the cartilaginous septum, but often of the anterior bony portion as well. This etiological factor is usually overlooked because it occurs in the night, disappearing prior to office examination.

In certain cases the patients sleep on one side habitually, thus the turbinal pressure on the septum is always in one direction. In other cases one turbinal being larger and more expansible than its fellow of the opposite side, periodical active and passive, as well as the inflammatory turgescences of coryza, rhinitis, etc., will push the septum into a position of deflection which in time becomes permanent, while the larger turbinal by hyperplasia becomes larger; which change is pathological. The idea that it is a physiological compensation and should not be touched is the foundation of failure in attempts at correction of septal deviation.

Almost every case of deviation demanding operation requires resection of the inferior turbinal on the concave side for two purposes. To secure immediate and permanent correction of the septal deviation, and to secure adequate nasal respiration during sleep.

It is an error to base the estimation of the adequacy of the nasal respiratory channel on either the patient's statement, or the apparent size on inspection of the channel, whether the parts be co-cainized or not. If the imprint of the inferior turbinal is seen on the septum, it is a certain indication for a radical resection of the inferior turbinated body (including a fringe of bone) on the concave side. "Soft" hypertrophies will expand at night and push upon the septum, yet shrink so small as to leave a large, free and open channel during the day. They often do more harm than "hard" hypertrophies, as they are often even more expansile. If left untouched, or what amounts to the same thing, if temporized with by the utterly useless galvano-cautery, the septum may as well be let alone, for the deflection will sooner or later reappear and be worse than ever. If the resection of the turbinal be sufficiently radical there will be no need of a Mayer, Asch or Kyle tube, nor of packing to hold the septum in its new position.

Whether the claim that many deviations are the result of turbinal pressure be admitted or not, no surgeon who has ever tried the rule here laid down for the successful correction of deviations will deny the ease and certainty of obtaining satisfactory results. When, after the removal and healing of the inferior turbinal, the resiliency and redundancy of the deviated septum are properly overcome, and the septum is placed in the median line, it will stay there. We will have taken away the only thing that can displace it. Let the skeptic not theorize. I would ask him to go home and take the case that failed of cure, cut out the inferior turbinal on the concave side, and after this is healed do his septum operation over again and note the result.

OPERATION FOR THE REMOVAL OF SEPTAL SPURS.

BY MELVILLE BLACK, M. D., DENVER, COLO.

The removal of spurs from the nasal septum has occupied a prominent position among nasal operations since the discovery of cocaine. The technique of the operation varies with the operator, no matter what method he may elect to use, and the success or degree of success resulting does not depend so much upon the method as upon the skill of the operator. If a man has no mechanical skill he will soon learn that operations upon the nose, and especially the septum, do not result satisfactorily. He possibly will condemn such operations in general. He may honestly believe that those who advocate them are deceiving themselves. He has found that topical applications, and cleansing methods have given favorable results in cases where operations have failed, both in his hands and in the hands of others. We rarely see each other's successful cases. We are more likely to see our own, and the other fellow to see our failures. If we promise brilliant results in a case in which someone has already failed, we may learn after our own vain efforts that the former rhinologist was a better man than we thought. The point is that no amount of operating nor any amount of treatment will relieve some patients. Their underlying vicious habits may frustrate all our efforts to relieve them until we can gain their co-operation in correcting some of these evils. There is no one way of curing diseased nasal passages, be it operative, non-operative, or systemic. Each has its place, and in the hands of an all-round man they all may be used to advantage.

The many instruments invented for the removal of septal spurs stand as evidence that there are a great many operators in the rhinological field. Personally I have found no instrument so universally satisfactory as the saw. I do not mean that I am willing to discard the others entirely for it. The chisel, the draw shave, the rasp, the trephine, and burr, and even scissors, all in their places are of distinct value. In the selection of a saw, my preference is for the Bosworth blade, which cuts equally on the push or pull. I am just carpenter enough to like such a saw, because it

complies with the simplest common sense blade of a carpenter's kit. I have never been able to see the advantage of a saw that cuts on the pull, and can see very decided disadvantages in a saw that cuts on the push. I have always believed that if some carpenters were to study surgery they would make good operators, and that if some surgeons would leave their professions to be carpenters they would make dismal failures as such.

We are inclined to take advantage of anything that will insure more accuracy in operative work in the nose. We have accordingly hailed with delight the ischemic effect of suprarenal, because by its use we are enabled much better to see what we are doing. If a spur is large it may be impossible to see that beyond it, the septum may be thin and deviated towards the same side. With a hand saw how easy it is to push the end of the blade through this



One-half actual size.

deviation and after sawing through the spur find it still attached. If it is forcibly removed with forceps a large perforation in the septum may be left. If its detachment is attempted with scissors or by further use of the saw the final removal of the spur is prolonged much to the annoyance of the patient, and the site of the operation is not as smooth as it should be. Before enumerating other instances of septal spurs wherein the use of a saw used by hand may prove unsatisfactory, let me speak of my electro-motor nasal saw. I first published an account of it in this Journal in July, 1896. In November, 1897, I published again in this Journal another account of it with some improvements that I had made. Since then I have not had occasion to modify it in any way. For a full description of it see the article above referred to.

This instrument has given me the very greatest satisfaction in the removal of septal spurs of all shapes, sizes and situations. Until recently I used it with the regular dental flexible shaft and hand-piece of S. S. White's, but I was more or less annoyed by some jerking of the saw due to the flexible shaft. Lately I have been using a Detroit shaft and hand-piece. Any dentist can tell you what it is, but its description is a little difficult. Suffice to say that the hand-piece is operated by a cord rather than a spiral shaft. With the Detroit hand-piece there is absolutely no jerking of the saw. It runs perfectly smoothly, and without noise. There is absolutely no spur that occurs on the nasal septum that I can not remove with this saw. The spur with the deviated septum behind it can be removed without the least danger of perforating the deviation, because it has only a quarter-inch stroke if preferred. Spurs on the bony septum situated high up are very difficult of removal by hand because of the difficulty in this situation of obtaining long enough stroke. With my saw there is not the least trouble; such a spur is just as easily removed as though it were on the cartilaginous septum. The greatest advantage I find with it, after using it six years, is that a spur can be so accurately removed. The line of severance of the spur from its base can be controlled perfectly, leaving a surface entirely even and smooth. This is of distinct advantage in the after-healing, no matter whether or not the mucous membrane be dissected up before the removal of the spur. The spur is rapidly removed. This may be of considerable advantage at times. Some patients become very faint during a prolonged nasal operation. I can remove a large bony spur in one-fourth the time with this saw than I can by hand. By hand the operator usually saws up or down, according to the ease with which he can get his saw to take hold above or below. With my saw, no difference how slanting the surface is, it will take hold without slipping.

At one time I used the trephine for the removal of many spurs because it was difficult to get the hand saw to take hold. I never liked the trephine for this purpose because of the uneven surface that it left, and because I have always felt that perforation of the septum was easy. Since the perfection of my saw I have never had occasion to remove a spur with the trephine.

VAPOR MASSAGE—ITS ORIGIN AND USES.

BY GEO. T. HAWLEY, M. D., CHICAGO.

Among the many improvements in our methods of treating affections of the ear, nose, throat and lungs that have been introduced during recent years, Vapor Massage is one of the most important.

Although comparatively little has been written on the subject, Vapor Massage is rapidly coming into general use, especially among that progressive class of physicians who are always on the lookout for improved therapeutic methods. As a result, many are attempting to employ this form of treatment without having a comprehensive knowledge, either of the form of apparatus or the details of manipulation which are essential to success; and as there are several inefficient outfits on the market, some have been disappointed in the results secured.

The credit for introducing this valuable method of treatment and for designing the first, and up to this time the only efficient apparatus for its administration unquestionably belongs to Dr. H. M. Dunlap, who states that in 1888 he began the experiments which lead to the complete development of the method of treatment to which he has applied the term "Vapor Massage," and which, according to his definition, consists in the application of nebulized vapor under pressure with more or less frequent interruptions, so as to produce a series of distinct and positive impulses.

The first complete apparatus designed by Dr. Dunlap for this purpose was constructed by the Globe Manufacturing Co., in 1895, and was exhibited by them in connection with the meeting of the Mississippi Valley Medical Association, held in Detroit in October of that year. This apparatus and methods of use were described by Dr. Dunlap in a paper read before the Michigan State Medical society in June, 1896.

A brief description of this apparatus and its essential features is necessary at this point for a thorough understanding of the subject.

The accompanying illustrations represent the apparatus that has been in use by the writer for some time, and is essentially the same as the original designed by Dr. Dunlap, and was made by the Globe Manufacturing Co., of Battle Creek, Mich.

Fig. 1 shows the complete instrument ready for connection with a compressed air cylinder by means of the usual air pressure tubing, which should be attached to the inlet valve "K."

"H" is a circular air supply tube to which the individual nebulizers "E" are attached. The air supply to each nebulizer is controlled by the valves "G," and each nebulizer is provided with a nebulizing or spray tube as shown in Fig. 2.

The nebulizing tube is a very essential part of the apparatus. It is so constructed that it will operate with very low air pressure, and will spray balsams, oils, and all other fluids without becoming clogged.

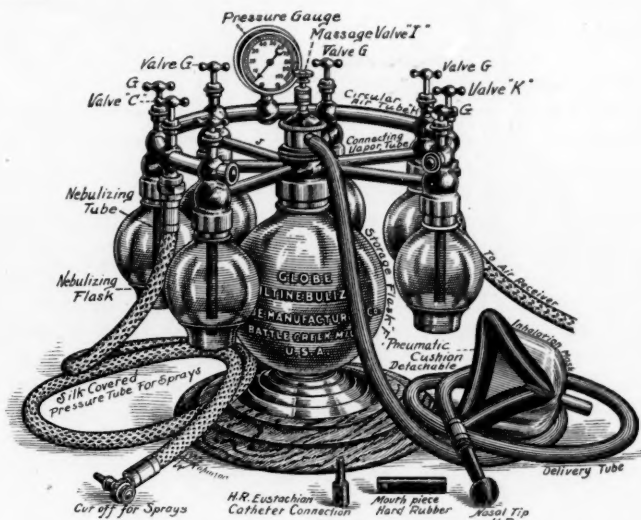


Fig. 1. Complete Four Flask Globe Multinebulizer.

The nebulized vapor from each nebulizer is discharged through separate tubes "J," which are lined with hard rubber, into the central flask "F." The provision of separate conducting tubes is important, as the condensation which always occurs, is deposited in the central flask, and when one common conducting tube is used the condensation from one nebulizer is deposited in adjoining ones, causing a mixing of the fluids.

The outlet of the central flask "F" is controlled by an ingenious valve "I," by means of which the nebulized vapor can be stored

and delivered under any desired pressure, either in a continuous or interrupted current, for the administration of Vapor Massage.

The construction of this massive valve "I" is shown in Fig. 2, having a section cut away. When the instrument is to be used for inhalations, etc., the valve is held open by screwing down the collar "N." If it is to be used for massage, the collar "N" is screwed

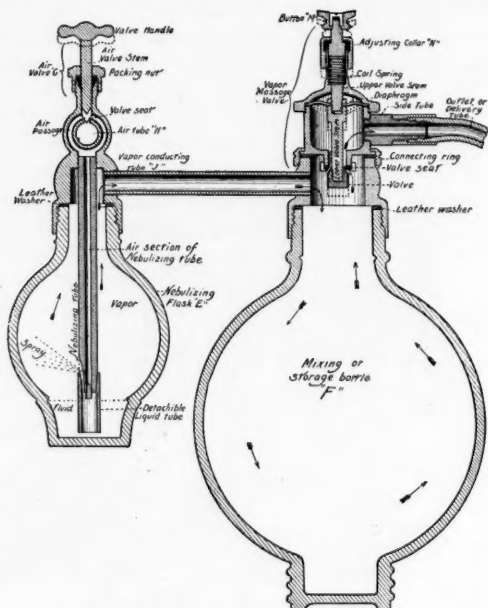


Fig. 2. Nebulizer—Sectional View.

up until the valve is closed by action of the coiled spring, and the vapor is then stored under pressure, but may be released by pressing or tapping on the button "M," which opens the valve; but is again closed by the spring the moment the button "M" is released. When a very gentle effect is desired, it is not necessary to reduce the initial air pressure with which the instrument is operated, but is only necessary to screw the collar "N" up until it comes almost in contact with button "M," serving as a stop to limit the opening

of the valve. In this way the vapor can be delivered in the gentlest zephyr, or with a hammer-like impulse, regardless of the frequency of the impulses, and without varying the initial pressure. Without this perfect valve control, and an elastic volume of compressed vapor as provided by the large central flask, Vapor Massage cannot be safely and successfully administered. And in selecting an outfit, these points should be the first and most important consideration.

An inhalation mask, hard rubber mouth and nasal tip, and catheter connection, are provided as shown in Fig. 1. This style of instrument has all of the metal parts protected from contact with the medicinal agents, either fluid or vapor, which is very desirable as it prevents chemical action or corrosion. Taken as a whole, it is all that could be desired for the purpose.

Vapor Massage, when properly administered, combines the therapeutic action of judiciously selected medicaments, applied directly to the affected tissues, with that of manipulation, the effect of which on the circulation, absorption, nutrition and other vital processes is well known through the benefit derived from the use of the ordinary manual massage when applied to the accessible parts of the body, Vapor Massage reaching those points which are inaccessible to the ordinary forms of manipulation.

With a suitably constructed apparatus, both the medication and manipulation can be efficiently applied to the naso-pharynx and connecting sinuses, the middle ear and Eustachian tubes, the larynx, bronchial tubes and lungs, giving a very wide range of usefulness.

In affections of the naso-pharynx, the parts should first be cleansed with a warm (never cold) antiseptic alkaline wash applied by means of a spray or douche. This may be followed by any ordinary form of application, if desired; then by Vapor Massage in which the medication can be made to meet the requirements in each individual case, either sedative, stimulant, astringent, or alterative, or a combination as may be necessary. The application of the vapor under pressure with the vibratory manipulation adds very materially to the action of the medicinal agents in reducing congestion and restoring normal circulation; also in stimulating absorption of exudates, etc. It brings about a healthy and normal action of the mucous membrane, acting also on the submucous structures. It opens the canals leading to the various sinuses where they are obstructed by congestion or thickening of the lining membrane, and carries the medication to those cavities which are

very difficult to reach by other means, but are frequently the seat of catarrhal conditions which sometimes produce obscure and very annoying symptoms. Catarrhal obstruction of the Lachrymal ducts is often materially benefited by persistent treatment. Many cases of hypertrophy of the turbinated bodies can be cured without the use of cautery or other operation, thus avoiding all destruction of tissue, which is very desirable. Adenoid growths can often be reduced by using strongly astringent and alterative remedies.

In applying Vapor Massage to the naso-pharynx, the massage valve "I" should be adjusted so it will close, retaining the vapor under pressure in the central storage flask, but will open just sufficiently to produce a decided impulse when the button "M" is suddenly pressed downward. The nasal tip "C" is attached to the delivery tube and applied firmly in one nostril, the other being closed with the finger. The patient should now be instructed to repeatedly pronounce the word "hook," "hook," "hook," and each time the button "M" of the massage valve should receive several light, sharp strokes with the hand, each stroke briefly opening the valve and allowing the escape of enough of the compressed vapor to produce a decided impulse in the naso-pharynx.

For middle ear affections the massage valve should be adjusted with the collar or stop "N" very close to the button "M" at first, so as to give a very slight opening; and if the catheter is to be used it should be passed in the usual manner, and the delivery tube attached by means of the connection provided for this purpose. A single pressure on the button "M" will produce inflation, as with the Politzer Bag, while a series of quick, sharp strokes will produce the massage or vibration effect. The diagnostic tube should be used; and if at first the pressure is insufficient to produce the desired results, the adjustment of the valve should be changed to give a slightly increased pressure as may be necessary.

In this way there is no danger of using too much pressure, as it can be regulated according to the results desired in each individual case; and for this purpose the adjustable valve is very essential.

There are various conditions of the middle ear in which Vapor Massage is very useful. It assists in overcoming adhesions, rigidity of the ossicles and contraction of ligaments just as manual massage will benefit similar conditions of an elbow or knee joint. It is especially valuable in acute otitis media, either catarrhal or purulent. If employed early, using camphor menthol and cocaine in oil, with very gentle pressure—just enough to keep the tubes open

—will generally reduce the pain and inflammation and prevent rupture; and if rupture occurs, is the best possible means of keeping the drum aseptic and free from discharge; also prevents adhesions and other complications.

Vapor Massage can be applied to the middle ear very efficiently in a great many cases without the use of the catheter, the manipulation being the same as for naso-pharynx. In every instance, whether the catheter, is used or not the naso-pharynx should first be thoroughly cleansed with an antiseptic alkaline wash. This is very important. In many cases of so-called middle ear catarrh it is necessary to apply the treatment frequently and with as high a pressure as can be tolerated without producing soreness or discomfort; unsuccessful results are often due to a want of vigor in pushing the treatment. But in all acute inflammatory conditions, the applications must be made with extreme gentleness, using just enough pressure to keep the tubes open and carry the soothing and sedative vapor into the ear drum. The use of Vapor Massage applied in this way, together with thorough, hot douching of the external canal, will control almost every case of acute inflammation if the treatment is commenced before suppuration actually begins.

In pulmonary affections Vapor Massage finds one of its greatest fields of usefulness. The effect on the pulmonary circulation is most decided; congestion is promptly relieved; irritation of the mucous membrane is allayed; the products of inflammatory action are more rapidly absorbed and eliminated; and the nutrition of the tissues is greatly improved by the combined action of manipulation and suitable medicinal agents directly and efficiently applied to the affected parts. Collapsed and inactive portions of the lungs are brought into activity; accumulated secretions are thrown off; expansion and respiratory action are increased with a correspondingly increased oxygenation of the blood.

Having in mind the action of Pulmonary Vapor Massage as outlined above, it will at once be seen that this is one of the most rational methods of treatment for pulmonary tuberculosis in which all of the normal functions of the affected tissues are deranged, and where, also, the efficient application of antiseptic agents is so urgently indicated. The manipulation favors the absorption of the antiseptic into the tissues, thus exerting a more direct action on the encapsulated bacilli. While it may not be possible in this way to destroy the bacilli, a strong inhibitory action is certainly exerted, and the surrounding uninvolved tissues are fortified to re-

sist the advance of the disease into new areas. If at the same time everything possible is done to build up the general nutrition, the chances of recovery are greatly increased.

The action of Vapor Massage in bronchitis, broncho-pneumonia, and in all congestive or inflammatory affections of the lungs and bronchi is very prompt and satisfactory. It is especially serviceable in cases of unresolved pneumonia, and restores the functions of a collapsed lung after pleural effusion. Is also useful in many other conditions which will readily suggest themselves.

In cases of bronchial and pulmonary congestion, there is very frequently a sense of oppression, as if there was a heavy weight on the chest. This is promptly relieved by Vapor Massage, giving way to a feeling of buoyancy which is very much appreciated by patients.

The importance of promptly removing congestion or inflammation of the lungs in every instance cannot be too strongly insisted upon, not so much on account of the immediate gravity of the condition, but because in these conditions the vitality and resistance of the tissues are impaired, and therefore susceptible to tubercular infection. Careful observation reveals the fact that very many cases of tuberculosis begin with a mild attack of "cold in the lungs," or an attack of "grippe," the prompt relief of which would have prevented the development of the more serious condition in many instances.

For Pulmonary Vapor Massage the collar "N" is adjusted so as to allow the valve "I" to close, and yet permit a free flow of vapor when the valve is opened, having the vapor stored at 15 or 20 pounds pressure. The patient holds the mouth-piece with the lips, closing the nose with thumb and finger, and inhales while the operator slowly opens the valve "I" permitting the outflow of compressed vapor, until the patient's lungs are fully expanded almost to the point of forcing the mouth piece from the lips. The valve is then allowed to close for a few seconds; is then given several sharp strokes, the impulses of which are transmitted through the medium of the compressed vapor to the entire pulmonary area. This process should be repeated several times at each sitting.

The application of Vapor Massage should, in most instances, be preceded with an application of the vapor at normal atmospheric pressure of several minutes' duration, so as to insure thorough medication of the parts. It is also advisable to supplement the office treatment by having the patient use a hand nebulizer several times daily.

THE NOSE AND THROAT IN THE HISTORY OF MEDICINE.

BY JONATHAN WRIGHT, M.D., BROOKLYN, N. Y.

(Continued from page 108.)

THE NINETEENTH CENTURY—THE PRAE-LARYNGOSCOPIC ERA.

I do not know how I can better usher in our story of a new epoch, than by going back into the Eighteenth century to pick up the thread of the ideas which have dominated the latter part of the Nineteenth. This I shall frequently have to do in matters more immediately cognate with our subject.

In 1779 Vicq D'Azir,* announced, before the Academy of Science in Paris, that he had been able to trace the intermaxillary bone in the human foetus, and he had Darwinism in his mind when he made the reflection that Nature seems always to model her works after a primitive ideal.

The Intermaxillary Bone in Man.

In 1784 Goethe wrote to his friend Herder: "I have found neither gold nor silver, but that which gives me an inexpressible delight, the *os intermaxillare* in man." This had been, apparently by an accidental blunder, as we have seen, described by Galen and depicted by many of the anatomists of the Renaissance. This had been, if we may be allowed the expression, a bone of contention for many centuries. The fact that man was supposed to have no intermaxillary bone was one of the arguments by which he was distinguished from the brutes, but Goethe believed in the unity of nature, and six years later he wrote his "*Metamorphose der Pflanzen*," in which is contained the philosophy of Spencer and the biology of Darwin.

And now we must plunge at once into the medical history of the Nineteenth century, returning, as I have said, many times to pick up the threads of our story amidst the records of past ages.

It is still impossible to comprehend the historical significance of the phenomena of the Nineteenth century just passed. We are just leav-

* *Oeuvres de Vicq D'Azir*, T. IV, p. 159.

ing it behind, and its proximity in the historical landscape gives us no opportunity for philosophical perspective, while the lifeless chronicle of events is a dreary work which is to be avoided if possible.

Bichat. The French Revolution, the great cataclysm which finally and irrevocably burst asunder the bands of ecclesiastical and political tyranny, horrible and frightful as was the catastrophe and its immediate results, was the denouement of that series of events to which the Renaissance was the prelude in the history of Civilization. In the Sciences, and especially in Medicine, the beginning of the fruition of this enfranchisement of thought, of speech and action did not become apparent until near the middle of the century. Coincident with the social and political upheaval in France appeared the genius which shaped the beginning of the new life in Medicine as radically as did Napoleon those events, the chronicling of which is called History.

Bichat was the first to turn the torrent of eager study and investigation of biological secrets toward the elucidation of the physiology and pathology of the separate tissues, as distinguished from the anatomical localities and organs of the animal body. Before Bichat, since the time of the Arabs, diseases were divided according to their situation, the head, the chest, the stomach. Morgagni first classified disease according to the lesions of the different organs of the body. Bichat, continuing the differentiation, described the different tissues of which the various organs were made up.

Since the revolt of Cullen and his predecessors from the old humoral pathology, we have been practically upon a basis of the Solidism which he had carried to such extremes. It is only within the last few decades that we have begun to perceive that all such divisions are impossible, all regions, all organs, all tissues, all of the body fluids are too intimately associated one with the other, to allow us to single out, in disease, any single unit as the entity exclusively deranged; but we may note a tendency in the recent trend of research in the problems of immunity for the pendulum to swing back again, after nearly two hundred years, to the domains of humoral physiology and pathology.

Bichat sketched the outlines of the study of physiology and pathology which were later filled out by the labors of the Germans, the schools of Johann Möller and of Virchow.

In his "Anatomie Pathologique" he considered the functions and the morbid states of the serous and of the pituitary membranes, but he insisted* that not only should pathology be studied from the

* Anatomie Pathologique. Dernier Cours de Xavier Bichat d'après un Manuscrit Autographe de P. A. Beclard—1828.

standpoint of the system of tissues affected, but from that of the character of the lesion as well. It is true, here as always, that this thought had existed in the minds of many before Bichat, but it was left to him to inaugurate its practical application. He, himself, had little opportunity in his short life to even begin the Herculean task of filling out this comprehensive schedule. He died when just turned thirty.

Before reviewing the comparatively few steps in advance taken in the knowledge of our subject during the prae-laryngoscopic era of the Nineteenth century, some reference must be made to special treatises.

In the early part of the century considerable attention was devoted to the nose as the organ of olfaction. Indeed, since the decline of the Galenic physiology and the establishment of the doctrines of Schneider, the fact had often been lost sight of altogether that the nostrils were an essential part of the respiratory tract. When it became evident that the air did not ascend to the brain, and the secretions of the latter did not drip downward in catarrh, the warming, dust freeing, moistening functions of the nose in respiration, upon which Galen laid the proper stress, sank from view and have only again been brought into prominence within the last two decades. We have seen that the mistaken idea of some of the early anatomists, as to the olfactory function of the accessory sinuses, long lingered after the error had been pointed out that they prepared the air for the brain. This idea of the nose solely as the organ of smell probably led to the prompt acceptance of the organ of Jacobson as an occasional diverticulum in the mucosa serving for olfaction. The great Cuvier laid the Danish anatomist's communication* before the Institute of Paris in 1811. Ruysch†, in 1703, pictured the orifice in the nose of an infant he had dissected. Morgagni‡ refers to Steno as having noted this organ in a sheep. He seemed to connect it in some way with cases, which Thomson (l. c.) rightly regards as instances of the escape of the cerebro spinal fluid from the nose. Sommering also noted it before Jacobson's paper.§

Deschamps in 1804 published the first separate "Treatise on the Diseases of the Nasal Fossae and Their Sinuses." Naturally prominence was given to the physiology and pathology of olfaction, and

* Descriptive Anat. d'un organ observe dans les Mammifères. Ann. de l'Inst. d'Hist. Nat. XVIII. 1811, p. 412-24.

† Ruysch: Thesaur. Anat. III. Tab. IV, fig. 5, A Edit. 1744.

‡ Morgagni: De sedibus et Causis Morborum. Lib. I. De Morbis Capitis 21.

§ For further information as to the history of the organ see "Nasenhöhle und Jacobson'sches Organ," Mihalkovics, 1898.

Deschamps declared that the filaments of the olfactory nerve may easily be traced to the middle of the nasal fossae, but he denied absolutely, as a result of experimentation, that the sinuses contribute anything toward the function of olfaction. This had been previously less emphatically asserted by Richeraud.* Notwithstanding these positive statements, such an eminent authority as Majendie in 1817 inclined to the opposite opinion. He says: "The larger size of the sinuses seems to coincide with a greater power of olfaction; this at least is one of the most positive results of comparative anatomy." He, however, admitted that the olfactory filaments had never been followed into the sinuses nor found in the mucosa of the inferior turbinated bone, nor on the inner surface of the middle.

Deschamps's work of more than 300 pages is one of considerable interest, not only because it was the first separate book on Rhinology, but because it may be supposed to represent fairly well the state of knowledge at the beginning of the century as to intranasal disease. He says nothing whatever of anterior rhinoscopy, nor of a nasal speculum, though, as we have seen, traces of both had from time to time appeared in medical annals. Notwithstanding this most important, and other scarcely less noticeable omissions, he professed to include all the matter of interest known to medicine in regard to the nasal fossae and their annexa in his book. He distinguished the ordinary tumefaction of the mucosa from the nasal polyp, and for the former he recommended the use of oiled bougies in dilating the obstructed channels of the nose. He divided nasal polypi into (1) fungous and vascular. (2) Mucous and lymphatic. (3) Scirrhus. (4) Sarcomatous. His methods of treatment were, (1) The local application of astringents. (2) Excision with a guarded bistouri. (3) Avulsion with the forceps, to which he devotes considerable space. (4) The knotted thread he speaks of with ridicule. (5) Chemical caustics, nitrate of silver—"mercurial water" (Acid nitrate?)—butter of liquid antimony, and the actual cautery. (6) Ligature with a waxed thread and with wire of pure silver.

These methods of operating he adapted to his different varieties of polypi, giving preference to the ligature. The wire loop adjusted with forceps and finger was, when in situ, tightened by pulling it through the eye of a probe or sound. The polyp was removed more by avulsion than by abscission. For ozoena, he recommended the application of the cautery when "the site of the ozoena permits;"

* *Nouveaux Elements de Physiologie*, Vol. II, p. 57, 1802.

otherwise he abandoned the treatment of this disease to palliative measures. He confused essential ozoena with the syphilitic. Considerable space in this book is devoted to the consideration of sinus disease, principally of the maxillary antrum, but he recognized the painful symptoms of acute catarrhal inflammation of the frontal sinus. He speaks of simple inflammation of the maxillary sinus, also of polypous tumors, and of dropsy of that cavity. He counsels opening the maxillary sinus, in suppurative disease, through an alveolus of a bad tooth if it exists; otherwise to make an opening above the alveolar border, in either case, large enough to introduce the finger. He advised an even larger opening where there were antral polypi. He has nothing to say of ecchondroses or deviations of the nasal septum.

A very much more comprehensive work, especially in historical matters, was the work of Cloquet,* which was first published in 1821. It professes to be a work on olfaction, but as a matter of fact it is much more than that. Its 750 pages exhibit the enormous erudition of the author, who deals with his subject in the most exhaustive manner and from every point of view. It is an inexhaustible source, from which one may draw accounts of all sorts of phenomena related to the sense of smell. Not only is this its prominent characteristic, but it deals incidentally, much more fully than Deschamps' book, with the nose and its diseases. Membranous occlusions of the nostrils, fractures of the nose, deviations of the septum which he considered to be usually irremediable, rhinoplasty, are all more or less thoroughly discussed. Coryza, vasomotor rhinitis, rhinorrhœa, and syphilitic rhinitis with other affections are treated together, and not sufficiently differentiated to satisfy the modern reader. The same may be said of other chapters in the book. Thickenings of the nasal mucosa are considered in a page and a half.

These works of Deschamps and Cloquet were not illustrated, but we may note in England the appearance in 1809 of the "Anatomico-Chirurgical Views of the Nose, Mouth, Larynx and Fauces" by John James Watt. It contains some colored charts of the parts with an anatomical description of them. They compare not unfavorably as to accuracy, but are perhaps not so artistic as the later color plates which have been issued so frequently lately. They are the first colored plates with which I am familiar showing the anatomy of the nose and throat.

A few separate treatises appeared in the prae-laryngoscopic period on the larynx. In 1826, William Henry Porter published a small

* *Ospthresiology*.

brochure in which he discussed croup, diphtheritis, œdematous laryngitis, phthisis laryngea, which he, like others, confused with syphilis of the air tubes, speaking at some length of the "mortification of the laryngeal cartilages." Traumatic laryngitis, foreign bodies and wounds are also discussed.* It is not accurate, therefore,

Albers. to regard Albers' work as the first special work on the larynx.

It appeared in 1829†. As Heyman has pointed out, it is a work of considerable value in that it collected what was known on the subject, but it is by no means exhaustive in that respect, and there is very little original matter in it. Of more value are the chapters he devotes to the subject in his later publications.‡ In his Atlas there are some striking drawings of laryngeal tumors. In other respects the works of Albers are noteworthy as almost the beginning of those publications on pathological subjects, which were soon to make the medical schools of Germany famous. In 1838 appeared the works of Ryland§ and of Columbat.|| Ryland speaks of croup as affecting children and the Diphtheria of Bretonneau as affecting adults. He refers also to spasmodic croup and hysterical spasm of the glottis, cases having been reported by Albers, Sir Charles Bell and Porter. Tumors of the larynx and tracheotomy occupy considerable space in his book. Columbat invented a clumsy instrument for opening the mouth and depressing the tongue, which he called a stomatoscope, also some devices of inferior interest for cutting the tonsils and the uvula.

Ryland and
Columbat.

Piorry.

A very much more interesting work, and one evincing more original though frequently erroneous ideas, is the one by Piorry published in 1844.¶ He opens his work with the remark that the diseases of the nose are unfortunately usually not considered in treatises on diseases of the respiratory system, and he insists on the doctrine, which received no help even from the advent of laryngoscopy, that not only many diseases of the larynx but also of the lungs depend upon morbid conditions of the nasal passages, nasal obstruction, so-called by him rhinostenoma, one of the forms of which we

* I am only familiar with the second edition published in 1837. Holmes speaks of the first edition as too limited in scope to be compared with the treatise of Albers, which appeared in 1829. However that may be, it is the first separate treatise on the larynx since the little work of Codronicus two and a half centuries earlier.

† Die Pathologie und Therapie der Kehlkopfkrankheiten. Leipzig, 1829.

‡ Beobachtungen a. d. Gebiet. der Path. 1836. Atlas der Path. Anat. 2te Abth. 1842.

§ A Treatise on the Diseases and Injuries of the Larynx and Trachea, by Frederick Ryland.

|| Traité des Maladies et de la Hygiène de la Voix.

¶ Ueber die Krankheiten der Luftwege, von A. Piorry. It seems to have been written but never published in French, the German edition being the only one I have found noted.

recognize in a deviated septum, the other being alternating vaso-motor stenosis. He proposed percussion, then a young science, for investigating the accessory sinuses. He described with considerable accuracy many of the sequelae of nasal obstruction and mouth breathing, including aural symptoms from closure of the Eustachian tube, and pulmonary changes, such as chronic dyspnoea and asthmatic attacks. He referred the cause of nasal disease to systemic affections. Crusts in the nose are to be removed after soaking in oil. He advised the introduction of bougies even in acute attacks. He described the dilatation of the alae nasi with a forceps to allow the light to fall in, but admitted that it was impossible to see very far by this means. Stethoscopy was also recommended by him in the diagnosis of intranasal conditions. He described rhinitis attending cases of the grip, which was prevalent in the first half of the century. On the whole this book exhibits a surprising amount of information in regard to intranasal conditions at an epoch when anterior rhinoscopy was feebly developed, and posterior rhinoscopy was unknown. Some of his ideas have not received the sanction of modern rhinology, but may not on that account be the less true. He declared that one of the causes of rhinitis was the cutting of the vibrissae in the vestibule of the nose which should filter the dust particle from the air. He asserted that water was injurious to the whole upper respiratory tract with the exception of the naso-pharynx, and syringing either the ear or the nose, especially with cold water, resulted in inflammation. Rhinitis thus frequently arose from bathing and diving. As treatment he urged the injection of oily or fatty substances in the nose. To such extremes did he go in this direction that he advised the anointing of the nostrils with oil while shaving or washing the face. The intranasal syringing of water he condemned very strongly except for the purpose of removing foul, stinking secretions. Nitrate of silver and various powders he recommended as medicaments for internal applications. His other therapeutic measures were of a general nature, in accordance with his views of etiology. Blisters, bleeding, purging, sweating, were the vigorous measures which were recommended for rhinitis, in keeping with the heroic treatment of his times. He confused ozoena with purulent disease of the accessory cavities. For intranasal operative procedures he refers the reader to the general works on surgery. His remarks upon affections of the larynx, trachea and bronchi, as one must expect in prae-laryngoscopic times, are confusing and of little value.

Nasal Bougies. .

Evil Effects of
Water on the
Nasal Mu-
cosa.

Systems.

In the first half of the 19th century, began again the custom of including in one work, or in a continuous series, all the medical lore known to mankind, but instead of such a work being attempted by one author it was divided among several. In these early Systems and Handbuchs and Traités, the chapters on the nose and throat are lacking, or treated in the most cursory and incomplete manner. As an example of this sort of literature one may be cited wherein the following was published, just three years before Garcia announced the event, which at once shed a new light on diseases of the larynx.

Friedrich * says: "Unfortunately the methods of physical diagnosis do not allow, in diseases of the larynx and trachea, that extended application they do in diseases of the deeper parts of the respiratory organ."

Laennec's "*Traité de l'Auscultation Mediate*" in 1819, his invention of the stethoscope, and the rapid development of the other methods of the physical diagnosis of the diseases of the chest, doubtless did their part in stimulating interest and curiosity, which finally culminated in the application of inspection to the diagnosis of intralaryngeal lesions.

Auscultation
and Percus-
sion of the
Nose and
Throat.

We have noted Piorry attempting to apply Laennec's methods to diseases of the nose, and we find Friedrich attempting to explore laryngeal phenomena by means of palpation, auscultation and inspection of the epiglottis through the mouth. In Friedrich's chapters we find intelligent attempts at differentiating tubercular from syphilitic diseases of the larynx, but œdema of the glottis and perichondritis laryngea are for him, as for many later writers, still pathological entities. He speaks of paralysis of the glottis with aphonia as paraplegias, but of course he had no means of establishing a diagnosis except from rational symptoms.

To return now to the individual topics of interest in the development of our laryngological and rhinological knowledge, we may begin again with Bichat.

In the few notes which remain to us from the works of Bichat upon the histology of the diseases of the pituitary membranes, he cast but little light upon the subject. We may note, however, that he questioned whether ozæna was really an ulceration, but leaned to the idea that it was a diffuse inflammation. He speaks† of the liability of the mucous membrane of the larynx to become gorged with serum during inflammation. He succeeded by traumatism in

* Die Krankheiten des Larynx und der Trachea; Virchow's Handbuch der Spec. Path. und Therapie, 1854.

† *Traité d'Anatomie Descriptive*, 1802, T. II, p. 399.

producing this condition in dogs, but we look in vain for those details of the study of the respiratory mucous membranes, which later followed, from Bichat's initiative, in the works of Bretonneau and others.

In 1791 Fourcroy and Vauquelin had* examined nasal secretions, both in health subjects and in those suffering from coryza, and had noted the salts of lime and soda. According to him, the mucus was the same from all the mucous membranes, but Berzelius later, on the contrary, believed it to vary according to the locality from which it was taken. Majendie thought that the mucous glands are not necessary for its formation, but that it is found where there are none, and also after death.

These were some of the preliminary studies which, together with the direction given to medical study by Bichat, lead to Bretonneau's Treatise on Diphtheria. In the works of Matthew Baillie, which, though not collected until 1825, were of a considerable earlier date, may be found several accurate accounts of the post-mortem appearances in those dead of Croup.†

Bretonneau
and Diph-
theria.

Anglada says: "It is known that Napoleon, in 1807, on account of a sorrowful event, put the question of croup to the Assembly; numerous and important works followed." He offered a prize for the best essay on the disease, owing, it is said, to the death of a son‡ from it. Not only in France, but elsewhere, as we have seen, the disease was being more carefully studied. John Cheyne, in 1809, wrote on "The Pathology of the Membrane of the Larynx, and Bronchi," a treatise which is chiefly upon the lesions of Croup, under which title he also published a work.

It was not, however, until Bretonneau's publication, in 1826§, that any very great advance is to be noted in the nineteenth century in the study of Diphtheria. He recognized its specific character and thus gave it its name (p. 41-43): "From the impossibility of applying to a special inflammation, so well defined, a single one of the names which have been given to its variations, allow me to designate this phlegmasia by the name Diphtheritis, derived from ΔΙΦΘΕΡΑ" which means a skin, an exuvium.

* *Annales de Chimie*, Aout. 1791, Vol. X, p. 13.

† See also "The Morbid Anatomy of Some of the Most Important Parts of the Human Body," 1793, and "A Series of Engravings," etc., 1800, III. Plate II, Fig. 1.

The word croup, first used by Home, is of Scottish origin, designating a membranous inflammation of the air passages, and is said to have primarily signified strangulation, but it is from a Gothic root, meaning to cry out, the term being applied to the disease probably on account of the altered tone of the voice.

‡ If this is so, it must have been an illegitimate son. Contant in his *Memoirs of the Private Life of Napoleon*, mentions no such event as the death of an illegitimate child at this time.

§ "Traité de la Diphtherie," 1826.

His work gives by far the best description of the disease which had yet appeared, but even in its clinical manifestations the differentiation was much at fault. In addition to his own remarks on the disease, he transcribed the works of many previous writers, among them that of Samuel Bard. He had performed tracheotomy for the laryngeal disease, and was of the opinion that his was the first case in which it was successfully done, though he refers to the case in London reported by Borsieri which I have cited. Bretonneau's work produced a great impression upon his contemporaries, and it is one of the landmarks in the history of diseases of the throat. Shortly after its publication, we may note the report of a fatal case of nasal diphtheria by Billard*, but he does not give it that name.

The Epiglottis.

Bichat† from experimentation had come to the conclusion that the epiglottis was in no way essential to the production of the voice, which, however, was altered when he cut off the tops of the arytenoid cartilages, and was lost when he severed them from one another in the middle line. We have seen how gross an error had entered into the conception of the ancients in supposing the epiglottis served to keep solids from the larynx, but permitted fluids to enter it. It gradually was accepted as an efficient valve to keep the latter out also. Majendie refused to accept this on authority. He said‡ he himself was of the former opinion, except for the doubt that should always exist in the mind of the physiologist. On extirpating the epiglottis in dogs he found they swallowed fluids as well as solids quite as easily without it. Elsewhere§ he asserts he had observed the same phenomenon in two individuals deprived of the epiglottis by disease. He, therefore, concluded that it was not indispensable in deglutition. From various experiments on animals he did much, not only to elucidate the mechanism of swallowing, but the action of the intralaryngeal muscles as well, though his conclusions have not been all of them confirmed by later investigations. One notes the significance of the new order of things in France at this time in the field of medicine as well as in all other subdivisions of science.

Innervation of the Larynx.

Le Gallois in 1812|| inaugurated a series of investigations as to the innervation of the larynx, to which later writers have not since added so large a number of well ascertained facts as we might expect from advances in other fields of physiological research.

* "Traité des Maladies des Enfants," 1828. I have seen only the second edition, 1833.

† "Traité de l'Anatomie Descriptive," 1802.

‡ "Mémoire sur l'Epiglote," 1813.

§ "Précis Elementaire de Physiologie," 1817, Vol. 2, p. 63.

|| Le Gallois: "Experiences sur le Principe de la Vie," 1812.

Dupuytren and Bichat had both observed the effect of cutting the pneumogastric, and many, since Galen's account, had noted the results of section of the recurrent laryngeal nerves, but it remained for Le Gallois to demonstrate that death, which so often supervenes, especially in young dogs, when the pneumogastriacs are cut, was due to section of the recurrent fibres in it, and that this also happened when both recurrences were simultaneously cut. He noted this happened less suddenly, the older the dogs were. He found that the glottic aperture was more narrowed by the operation in young than in old dogs. He also drew attention to the varying effects from ligation of the recurrences, due to the degrees of pressure exerted. Le Gallois did not take so much pains to record the color and sex of the dogs in his experiments, but on the perusal of his work it may easily be seen how much of the work of more recent, more voluminous, and less readable experimenters was anticipated by him.

Sir Charles Bell* in 1821 asserted that because the vagus nerve does not arise by a double root and has no ganglia, it is not a nerve of sensation, he having shown, simultaneously with Majendie, that the posterior roots of the spinal nerves are sensory and the anterior roots are motor filaments. Another theory of Majendie was contradicted by Robert Willis in 1829, and later by Claude Bernard. They showed that it was erroneous to regard the superior laryngeal nerves as supplying filaments to the closers of the glottis, and the inferior laryngeal nerves as sending branches exclusively to the openers of the glottis. Willis, according to Holmes, did much to elucidate the actions of the various intralaryngeal muscles, a matter still involved in much uncertainty†. Marshall Hall in 1836‡, and Dr. John Reid, as well as Majendie, contributed largely to the development of our knowledge of this intricate subject. Hall was apparently the first to point out the reflex nature of Spasmodic Croup. His idea that it is due to the irritation of teething, indigestion and constipation has been much invalidated, but only in very recent years.

Sir Astley Cooper, in drawing attention to his discovery of the ganglion of the superior laryngeal nerve in the vagus, opened the

* "On the Structure and Function of the Nerves."

† Some of the statements ascribed to Willis by Holmes had been long previously made by other observers.

‡ "Lectures on the Nervous System," and especially later in 1841 in his book "Diseases and Derangements of the Nervous System."

way for Cock* and Hilton† to declare the internal branch was exclusively a nerve of sensation, the inferior or recurrent nerve being the exclusively motor nerve of the larynx and the external branch of the superior laryngeal, supplying the crico-thyroid muscle. Dr. John Reid‡ confirmed these conclusions and added many new facts by his investigations upon the glosso-pharyngeal and vagus nerves.

Majendie was of the opinion that section of the superior laryngeal nerve prevented the emission of almost all acute sounds, but Longet§, who prefaces his account with an exhaustive bibliography of the work of previous observers, declared, as had Bischoff before him, that the section of this nerve produces no effect upon the voice in dogs. They also asserted that the Spinal Accessory is the motor root of the pneumogastric nerve, Galen having considered the former a branch of the latter. They cut the Accessory filaments within the skull and obtained aphonia and hoarseness in animals. Notwithstanding this, Claude Bernard||, that materialistic philosopher, who in many ways exercised such a pernicious influence on French thought in the decades which followed him, insisted that the Spinal Accessory is a motor nerve and the Vagus is a mixed one at their origin, and that they do not bear the relation to one another of the anterior and posterior roots of a spinal nerve, but that the Spinal Accessory is a motor nerve which regulates the movements of the larynx and the thorax every time these organs are to produce phonation, and that the Pneumogastric regulates them in respiration. Therefore the Spinal Accessory should be regarded rather as the antagonist than as the co-efficient of the Vagus, as phonation for the moment suspends the act of respiration. He confirmed the observation by Majendie as to the lack of effect on the voice of the section of the superior laryngeal nerve, which lesion induces anæsthesia of the larynx.

Voice Produc-
tion.

The history of the advance in the knowledge of the innervation, and of the kinetic phenomena of the larynx, is intimately associated with that of voice production. It therefore seems best that some account of it should be given here, though this must be done in the most cursory way. Full accounts of the progress of such knowledge

* Edward Cock: "Gray's Hospital Reports," 1837, p. 311.

† John Hilton: *Ibid.*, p. 514.

‡ "Edinburgh Medical and Surgical Journal," 1838, Vol. 49, p. 109.

§ "Anatomie et Physiologie du Système Nerveux," 1842, T. II, p. 271.

|| "Archives Generales de Medicine," 1844, April, p. 397, May, p. 51.

may be readily found in the separate treatises of Gordon Holmes,* of Fournié† and of others. We must retrace our steps considerably. We have seen the very crude ideas of Democritus, Hippocrates and Aristotle, and we have to regret the lost treatise of Galen on the voice, which perhaps would have revealed to succeeding generations clearer ideas on the subject. We find in all the Prae-Renaissance and Arabian works constant reference to Galen's conception of the larynx—in mediaeval Latin, the "principalissimum organum vocis." The first reference, which I have noted after Galen, is to a more extended and exact conception of laryngeal physiology to be found in the remark of Paré on the anatomy of the larynx. "When the cartilages are open the voice is large like the Basse-Contre. On the contrary, when they are compressed, the voice is shrill." It was long after the time of Paré before the matter was taken up as a separate study. Casserius indeed, in his work on the larynx, discusses voice formation to a considerable length, as did many other anatomists incidentally, but it was Claude Perrault (1613-1688) who first explained the voice by mechanical laws and especially endeavored to demonstrate that it is produced only by the larynx without the trachea taking any immediate part in it.‡ He compared the larynx in birds and animals with the human organ.§ "As regards the tone of the voice, it is low and grave when the glottis makes a long slit, because this makes the lips relaxed and their vibrations slower." He insisted that the upper parts of the air passages take part in the formation of the voice. He likened it to a flute, the muscles at the larynx working the variations.

Shortly after this Dodart|| took the matter up. He insisted that the trachea only furnishes the material of the voice, *i. e.*, the expired air. The glottis is the only organ of the voice. All the effects of the glottis for tones depend on the tension of its lips, and of its various internal structures. The concavity of the mouth has no part in the production of the voice, but it is a modifier of it, and still more is this true of the nose. He showed that Galen's comparison to a flute could not be accepted, if one went into details. He spoke of the vibrations of the ligaments, and of the

* Holmes: "Vocal Physiology and Hygiene," 1879.

† Fournié: "Physiologie de la Voix et de la Parole," 1866.

‡ Sprengel: l. c. V. 150.

§ "Oeuvres Diverses de Physique et de Mécanique," Edit. 1721, Vol. 2, p. 392; also *Ibid.*, Vol. I, p. 220, II partie, Du Bruit.

|| "Mémoire sur les causes de la Voix de l'Homme," par M. Dodart, *Mem. de l'Académie des Sciences*, 1700, p. 238.

dilations and contractions of the glottis. He asserted the trachea is elongated in high notes, and shortened in low ones. He likened the vocal organ rather to a horn or trumpet. According to him, the glottis is the place which corresponds to the lips of the musician; the body of the instrument extends from the glottis to the external orifice of the vocal canal, that is to say, to the mouth.

In 1742 Ferrein modified the conception of Dodart somewhat by comparing the larynx to a stringed instrument such as the violin.* He was the first in accordance with this idea to apply the name "vocal cords" to the lips of the glottis. Dodart, as we have seen, had taken note of the oscillations of these ligaments, but Ferrein more particularly saw in them the principal instruments of the modulation of the voice, and he reported a number of observations which tended to prove that the air in striking the glottis produced different tones according to the vibrations which these parts performed. Bertin, in 1745, inclined to the simile of Dodart, asserting that the vibration of the glottis was not sufficiently free to allow comparison with the oscillation of cords. Ferrein's view was adopted by Montagnat (1746), who called attention to the second larynx in birds, which is supplied with a taut membrane which is able to produce the same notes as the ligaments of the glottis. Haller in his great work† wrote a long dissertation upon the voice and the parts played in its formation, by the various structures of the nose and throat, referring to the accessory sinuses as having the function of making the voice more sonorous. He seems, however, to have added very little that was original to our actual knowledge, and the same may be said of Walther‡, but the latter has much to say of the intralaryngeal movements.

We should not pass on to the nineteenth century in this matter without taking note of the noble labors of Johann Conrad Amman.§ Although Hartmann says that the Spanish Benedictine monk, Pedro de Ponce, in the sixteenth century, proved that deaf mutes can be taught to speak, Amman's is the first treatise upon a method of teaching the mute to talk. He followed practically the same method of teaching as is now used in the various institutions for that purpose, *i. e.*, lip reading.

* Vid. Sprengel l. c. and Columbat: "Traité des Maladies et de l'Hygiène des Organes de la Voix," 1838.

† "Elementa Physiologica." Ed. 1741. Tomus III, Lib. 9.

‡ "De Hominis Larynge et Voce." Haller's Disp. Anatom. 1749, Vol. IV, p. 691.

Surdus Loquens sive Dissertatio de Loquela, 1740.

Under the impetus of the new life in France, Majendie took up the study of voice production where it had halted for the best part of a hundred years. He was the first who actually saw by experimentation on animals the vibration of the vocal cords "in vivo." He* again more confidently compared their actions to the vibrating bands of wind instruments, this in animals depending on the contraction of the laryngeal muscles rendering the vocal cords taut, the intensity and volume of the voice depending on the extent of the vibrations, and this depending on the length of the cords, the size of the larynx and the amount of the expulsive force of the air current. In contradistinction to Ferrein, he taught that the tones of the voice depended not so much on the tension of the cords as upon the length of their vibrating surfaces, deep tones being due to the vibration of the whole length of the cord, and the high notes to the vibrations only of the posterior portions, varying with the height of the note. The larynx rises in high notes and descends in the low notes, thus lengthening and shortening the vocal tube. He regarded the ventricles of the larynx as anatomical devices to allow of the separation of the true from the false cords. He differed from Bichat in supposing the epiglottis to have something to do with the formation of the voice. He also noted the modifications of the voice by the cavities of the mouth and nose. Holmes (l. c.) refers to Lis-covius as having dwelt upon the importance of the width of the vocal slit in voice production, a matter appreciated, as we have seen, by Dodart and exaggerated by Paré before him. Sehfeldt, in 1835, was the first to state that the falsetto voice is produced by the action alone of the edges of the vocal cords. Holmes says that Biot in 1816 originated, and Cagniard de la Tour by his invention of the siren† in 1825 demonstrated the accepted theory of sound produced by the vibration of tongued instruments.

Mayer‡ and the great Johann Müller§ wrote at great length on the subject, but in a manner most discouraging to the modern reader. In this respect, however, they were surpassed by Harless.|| He wrote a two hundred page article on the voice, in which the most exhaustive examination of the anatomy of the parts was made. His-

* Majendie: "Précis Élémentaire de Physiologie," T. I, p. 210.

† The siren consists of a revolving plate pierced by holes at its circumference, through which on passing in its revolutions over an aperture air is forced, the rapidity of the revolutions regulating the pitch of the musical note produced.

‡ Mayer: "Archiv für Anatomie und Physiologie," 1826, p. 188.

§ Müller: "Handbuch der Physiologie des Menschen," 1840-2, p. 179.

|| Emil Harless: "Wagner's Handwörterbuch der Physiologie," 1853, IV, p. 505.

tological, chemical, dynamic investigations are detailed with unwearied industry and indefatigable zeal. Its very ponderosity has buried it in oblivion. It is highly probable that a careful study of it might reveal matters of interest to the modern student, brave enough to undertake the task.

This brings us up to Garcia's invention which revolutionized the study of voice production. Many works rapidly appeared, among which may be mentioned Merkel's "Funktionen des Menschlichen Schlund und Kehlkopfes" (1862). He had previously, before the importance of the advent of the laryngoscope was appreciated, written his "Anthropophonik." In 1861 Bataille in a memoire* presented to the Academy of Sciences, following up the suggestion of Garcia, advanced very decidedly the knowledge of the finer intralaryngeal movements in phonation and in singing, though his results were stated somewhat dogmatically. Notwithstanding the invention of the laryngoscope and the numerous exhaustive monographs on the subject of voice formation, among which may be noted Grüntzner's†, little was established beyond what had been discussed in prae-laryngoscopic days. The photography of the larynx by French‡, a triumph of ingenuity, skill and persistence, resulted in upsetting many of the ideas, conceived not only by the early investigators, but much also which had been advanced since the introduction of the laryngoscope. Willis in 1830 advanced the idea that the vibration of the air in the cavity of the mouth was independent of the vibration of the laryngeal air, and thus the formation of the voice was a complex process. This idea was superseded by the somewhat similar but modified over-tone theory advanced by Helmholtz§, who derived the idea from Wheatstone.¶ This has since been the prevailing theory of voice production, which, with modern apparatus of precision, is being so scientifically investigated by Professor Edward Scripture.

Photography.

Modern
Theories.

* *Nouvelles Recherches sur la Phonation*, 1861. Ref.: "Gaz. Hebd. de Med. et Chirurg," 17 Mai 1861.

† "Hermann's Handbuch der Physiologie," 1st B-d, 2te Theil, 1879.

‡ *Trans. Am. Lar. Ass'n*, 1882

§ *Lehre von den Tonempfindungen*, 1862.

¶ *London and Westminster Review*, 1837.

A NEW PHASE OF SERUM THERAPY. A NEW SERUM FOR USE IN MIXED INFECTIONS.*

BY E. VON QUAST, M. D., KANSAS CITY, MO.

At the time when I read my first paper before the Jackson County Medical Society, in 1895, I made a statement that if we could only get an antitoxin which would combine the anti-streptococcic and anti-diphtheritic serums we would have the remedy, *sine qua non*, in mixed infections. Close observation and repeated cultures for a number of years convinced me that most of our cases of diphtheria were due to mixed infections, especially by the streptococcic germ; and while we succeeded in conquering the infection of the Loeffler germ by the intelligent use and early administration of full doses of diphtheria antitoxin, we did not combat the septic infection caused by the streptococcic germ; hence some form of sepsis or suppuration appeared, after all. No doubt all membranous deposits in the pharynx and larynx are not purely diphtheritic, and sometimes we find a prevalence of streptococci.** The angina of scarlet fever with its membranous deposits is always the result of a mixed infection, but frequently the bacilli of diphtheria are present, though not always. The unsatisfactory action of Behring's antitoxin in these cases made me investigate, and I found that the swollen glands in the neck, the ear trouble, the nasal trouble, etc., were septic in character, produced by pyogenic germs, streptococci in abundance, and anti-streptococcic serum alone did not produce the desired effect.

Correspondence followed with the reliable house of Parke, Davis & Co., of Detroit, Mich., and after repeated requests to make experiments, a horse was immunized first against tetanus, then streptococcus and diphtheria infection. They succeeded admirably, and furnished me with the first batch of serum early last March. For some time I had no chance to use it, and during the period of severe scarlatina infection, I was compelled to resort to the anti-diphtheritic serum alone. The results with the above cases were not what I should desire to see. Since then I have

*Read before the Jackson Co., Missouri, Medical Society.

**Vide Pruden's Reports.

had a number of cases, eight in all, three of which were of very violent and malignant types of scarlatina, in which I used the special serum with the most gratifying results, in fact, it has surpassed my highest expectations. The action was very prompt and efficient. In none of these cases was any ear trouble experienced; even at the beginning of the appearance of the exudate it is checked rapidly. The swollen glands disappear, and no suppuration has been seen in even the worst cases; neither nephritis nor other complications have developed. The desquamation was diminished in the majority of cases where the angina or throat exudate appeared in the first days of the illness. In none of these cases did laryngeal symptoms develop or follow; in only two appeared urticaria, which was formerly met with so often after the administration of anti-diphtheritic serum. Two of the scarlatina cases were children, four years of age, and one a married lady; of the other mixed infection cases, three were children and two adults. (The diagnoses in all these were verified by cultures.)

The following case, which came under the observation of J. M. Frankenberger, M. D., of this city, was the youngest child of a family living in an unsanitary dwelling, and is of particular interest: The child, who was two years old, was taken ill Saturday evening, March 16; the temperature was 100° , and the patient complained of headache and sore throat; and there was a rapid pulse. Sunday, March 17 he felt worse, and the temperature was 102° ; no membrane was discovered in the nose or throat. On Monday, March 18, the condition was much worse; the throat was swollen, the temperature rose to 104° , with a great deal of coryza, but no membrane was visible. Cultures showed streptococci and staphylococci with no bacilli of the Klebs-Loeffler type. On Tuesday, March 19, the temperature reached 105° , the glands of the neck were swollen, the membrane was visible on the upper and back part of the pharyngeal wall; cultures showed the presence of streptococci, staphylococci and bacilli of diphtheria. An injection of the mixed anti-toxins was made on Wednesday evening, March 20, by myself; in six hours the temperature had fallen from 105° to 103° , and the patient complained of hunger for the first time in five days. Inside of twenty-four hours, the glands of the neck were considerably reduced in size, the growth of membrane was checked. The patient was discharged on the following Sunday, and, though very weak, no visible signs of disease could be found. No internal remedies except stimulants had been administered. The recovery took place uninterruptedly. No signs of paralysis were observed in any of these cases.

I trust my fellow practitioners may decide to test this product thoroughly, and also that they may have the same excellent results which I have experienced. I would be very glad to see reports from any others who have tested this method of treatment.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Stated meeting, February 26, 1902.

Emil Mayer, M. D., Chairman.

Surgical Treatment of Congenital Defects of the Palate.

Dr. Truman W. Brophy, of Chicago, delivered an address on this subject, illustrating by lantern slides his method of operating. He said that what he had done in this field was the result of a stimulus received while a student in New York City at the clinic of the late Dr. Lewis A. Sayre. In one of these lectures, Dr. Sayre said if there were only a way by which the two sides of the cleft palate could be sprung together, and maintained in that position, the deformity could be relieved. At that time the method of doing this was unknown, and the speaker said he had thought over this statement of Dr. Sayre for ten years. He had then carried wire sutures through the maxillary bones, placed lead plates on the outer portions of those bones, forced the two sides together, and succeeded in getting union. This had led him to work quietly in this field for seven or eight years before publishing his method. At the Congress in Chicago, in 1893, he had read a paper on this subject, which had attracted considerable attention. Up to the present time he had done 650 operations on patients having cleft palate, both infants and adults. Of the young children, about 250 had been operated upon by transfixing of the bones, and the results would be shown by means of the lantern slides. Dr. Brophy then presented a series of lantern slides illustrating his method. The main points touched upon by the speaker in connection with the description of these pictures, were: (1) The original plan of forcing together the maxillary bones by means of several strong silver wire sutures, reinforced by lead plates, and passed in such a way as not to occlude the passage through the nasal chambers; (2) the use of tension sutures inserted into the soft palate at a considerable distance from the line of coaptation sutures, and pass-

ing on either side through slots in a strip of lead, thus giving not only a secure hold, but practically putting the soft palate in splints during the process of healing; (3) the fact that in these cases of cleft palate the upper jaw is wider than the lower jaw, and the upward thrust of the latter tend to widen the cleft in the palate.

Dr. Robert Abbe said that he had had a moderately large experience in this trying field of surgery, and had been surprised at the lucidity of the descriptions of this difficult subject that had just been presented by Dr. Brophy. The methods of dealing with both the hard and soft palate did not seem to him very different from those employed in surgery during the past quarter of a century. The reason the operation had been discarded by some surgeons was apparently not because it had failed to produce union of the line of sutures, but because it had been found that the voice was not much better than before operation. Failure to get union in the line of sutures was overcome by Langenbeck's method of dividing the curtain of the palate. Since the adoption of this method he did not recall a case in which he had failed to secure union. It should be remembered that a single line of sutures close to the border would often cut through unless reinforced by another line at a greater distance from the border. This was well accomplished by the lead plates used by Dr. Brophy. The speaker said that ten years ago he had had a rubber plate made to fill the roof of the mouth before the operation, and had replaced it and left it there during the ten days of repair. After having tried it in several cases he found that it did not improve his results. It could not be denied that the newly-made palate is abnormally tense. The device of Dr. Brophy for bringing together the maxillary processes was most admirable, and he would try it at the first opportunity. It certainly gave greater freedom to the soft palate at the back. As to the desirability of operating in the earliest months of life, he would say this was eminently the proper thing to do for the purpose of bringing the jaws together. Hitherto he had not repaired the hard or the soft palate under two years of age, and had always preceded it by an early operation on the lip, but he must admit that this certainly diminished the field of operation. He had been able to do the work just as well with the Hagedorn needle as with any of the special needles for this class of work. The defective hearing observed after this op-

eration he did not think was due to the division of the tensor palati. Where the palate was defective Nature tried to close the posterior defect by bringing the palatopharyngeus together more than ordinarily, but in addition to that it would be found that adenoids were uniformly built up between, and they probably had a great deal to do with the blocking up of the Eustachian tube. When the curtain of the palate was very hard, the suggestion of making nicks on the side was a good one, and would help some.

Dr. Arpad G. Gerster said that the deafness observed in so many of the patients suffering from cleft palate was certainly not dependent upon the division of the tensor palati muscle, for, defective hearing was observed very often in persons coming for operation for this deformity, if they had reached a certain age. The defective hearing could probably be explained by the fact that the usual aeration of the nasal cavities was not effected and foreign bodies were introduced into the nasal passages almost constantly—in other words, a chronic naso-pharyngeal catarrh appeared to be the cause of the defective hearing. A very large proportion of these patients also showed not only a defect in the closing of the palate, but an atrophy and a functional defect. This involved all of the palatal muscles and the pharyngeal muscles. This often explained why the functional result was very bad, although the technical result of the operation was excellent. For this reason, Kingsley's plate often had to be resorted to in order to give proper function. These patients often show shyness, unwillingness of speech, and other peculiarities. There were, of course, some people who were intelligent and anxious to do their best, and with these massage and proper exercises can and will do a great deal of good. When the mucoperiosteal flap was separated the arc was converted into a straight line, and the space thus left filled in with blood clot, but it would be found twenty-four hours after the operation that, as a result of the atmospheric pressure, the liquid portion of the clot was squeezed out and the arc in this way gradually become re-established. The objections made to Dr. Brophy's operation by Dr. Stone, of Boston, did not seem to him at all valid. It should always be remembered that the nasal and oral cavities require to be separated, and if nothing else than this were accomplished it would be a great deal, and far superior to any plate for closing the opening. Dr. Brophy's idea of ap-

proximating the alveolar processes of the hard palate was an excellent plan, and certainly removed one of the most formidable features of the operation, the danger of severe hemorrhage. The peeling up of the mucoperiosteal flaps according to the Langenbeck method, was a very bloody procedure. He believed the operation was never so useful as when done on the newly-born infant. The reason for this was the well known fact that a large number of such children die from neglect and starvation. He had found the ordinary Peaslee needle in the fixed handle a most useful instrument for introducing the sutures. If the ordinary Peaslee needle were used with the cutting point curved on the flat the needle punctures, after tying the sutures, became small rhomboidal openings, which admitted infection. On this account, he had had the Peaslee needle made with the cutting edge in the other direction, so that the needle punctures became slits on tying the sutures.

Dr. James F. Mc. Kernon said he could only express his admiration for the method of operating described by Dr. Brophy. The speaker said that several years ago he had begun operating upon cleft palate on adults as well as children. He had operated by the older method described by the previous speakers, but his results had been uniformly bad. About six years ago, at the suggestion of a surgeon, he had adopted a somewhat different method with better results. This method involved the performance of a preliminary tracheotomy under cocaine the day previous to the operation. This allowed more rapid operating, prevented the discharges from going into the stomach or larynx, and allowed of treating the wound somewhat after the manner of a wound on the external surface of the body. His plan was to pack the mouth perfectly full with gauze, nourishing the patient by the rectum. The first dressing was removed at the end of twelve hours, as there was rarely any vomiting when the chloroform was administered through a tracheotomy tube. The dressings were reapplied after simply cleansing the wound. He had adopted this method in the cases of sixteen adults, and four children during the past six years, and, with the exception of two adults in whom sloughing took place, and in a child in whom the operation completely failed, the results were uniformly good. The youngest child operated upon in this way was one year old, and the oldest adult, thir-

ty-two years of age. Nearly all of the adult cases had presented defects of hearing on one side or the other before operation. They had all been tested functionally before operation, and in all of them, after six or eight months after the operation, the hearing had improved. He did not now cut internal to the hamular process, but used the Langenbeck method, cutting close to the alveolar border and leaving the substance of the muscular tissue as complete as possible. He found that if the adult patients were taught the proper method of articulation, the result would be good. Many of the early cases operated upon had not received this most important after-treatment. He was an advocate of an early operation, though he would hardly like to do the preliminary tracheotomy in a child under one year of age. He believed the palate should be closed first and the lip subsequently. He had found in his case that the soft palate would retract and form an arch, even though three or four weeks after the operation, the appearance was such as to lead one to believe that a perfectly normal palate would result. When the palate became retracted he employed massage, but he had not noted any good result from it. In nearly every one of his adult cases there had been a remarkable shyness, and in some a melancholy spirit, and if for no other reason than to relieve this, he believed the operation should be done, because if instructed how to talk, they would be able to mingle without discomfort with their fellow beings. He made use of a needle in a fixed handle, similar to the Hagedorn needle.

Dr. H. Lilienthal believed that these unfortunate children became sensitive to ridicule at an early age, and hence they should be operated upon very early, and from the first be taught correct articulation, instead of doing a late operation and undoing former teaching. Dr. Brophy had certainly convinced him that the upper jaw was wider than it should be in these cases, and that by forcing the parts together we corrected Nature's error. This was infinitely more rational than simply doing a plastic operation for the purpose of filling in a gap that should not be there. He had thought until this evening that he had been making use of an original method by adapting Tait's flap-splitting method to the operation on the palate, but he had learned that Dr. Brophy had antedated him in this. He did not think preliminary tracheotomy was ever called for in this class of cases. He believed Dr. Mc.

Kernon would succeed just as well without this unnecessarily dangerous preliminary procedure.

Dr. J. S. Stone, of Boston, being asked to take part in the discussion, said that he was very glad indeed to hear Dr. Brophy's paper. Some of the pictures shown had apparently been taken far forward, and the lower jaw appeared to be narrower than the upper jaw because the lower jaw was sectioned nearer the front than the upper. In all the cleft palates that he had seen the cleft had almost invariably grown narrower; he had never known of the cleft growing wider.

Dr. Brophy closed the discussion. He said that he did not know that anywhere in the literature of the subject Langenbeck had suggested the application of lead plates, which not only serve as splints during the process of union, but also serve to prevent the cutting out of the sutures. As to the question of seemingly defective mentality in these patients, he would say that he thought this was largely due to the embarrassment and mortification which they had experienced from the taunts and ridicule of unthinking playmates. Of course, it was well known that these children often presented other defects. For example, he remembered a child of three years, who had been brought to him with double hare lip, cleft palate, widely open fontanelles, curvature of the spine, and with six fingers and two thumbs on each hand. He had been delighted to find the speakers this evening so generally in favor of early operation, because by such practice many of the difficulties attendant upon articulation would vanish. He wished to say here that many of these children, if operated upon early, would speak correctly when old enough to learn to speak. Some people having decidedly defective palates, learned to speak fairly well, while persons with good palates often, as a result of bad habits, spoke poorly and incorrectly. He had never yet felt in any case that it was essential to do tracheotomy. He would say to Dr. Stone that the palate grows wider, even in utero, and that it does so because by muscular action the lower jaw presses upward against the inclined plane presented by the upper jaw, thus forcing the two halves of the upper jaw more widely apart. These operations should be done in early infancy: (1) Because the parts are soft and can be more easily approximated than later; (2) because the child does not receive the same shock that it does later in life; (3) because the parts are put in the proper position and the child is better nourished in consequence, and (4) because the child is thus enabled to speak correctly on arriving at the age at which it can speak at all.

LARYNGOLOGICAL SOCIETY OF LONDON.

Annual Meeting, Friday, January 10, 1902.

E. CRESSWELL BABER, M. B., President, in the Chair.

The following officers were appointed for the year: President, E. Cresswell Baber, M. B.; vice-presidents, E. Clifford Beale, M. B., F.R.C.P., and F. W. Bennett, M. D., and Dundas Grant, M. D.; treasurer, William Stewart, F.R.C.S., Edin.; librarian, St. Clair Thomson, M.D., F.R.C.S.; council, F. de Havilland Hall, M.D., F.R.C.P.; Sir Felix Semon, M.D., F.R.C.P.; H. Lambert Lack, M.D., F.R.C.S.; Richard Lake, F.R.C.S.; Ernest Waggett, M.B., and J. Barclay Baron, M.B.; secretaries, Charles A. Parker, F.R.C.S. Edin., and James Donelan, M.B.

Specimen of a Pedunculated Angioma of the Larynx.

Shown by Dr. Browner. The patient, a strong, healthy man aet. 63, was seen in June, 1901. For the last twenty years the voice had been slightly hoarse, and he could not speak for any length of time with comfort. Five months ago the voice suddenly became very hoarse, and had remained so ever since. There was no dysphagia or dyspnea. A large red raspberry-shaped growth was seen in the glottis, about the size of a marble; only a small part of the vocal cords was visible. A piece of the growth was removed for examination. The Clinical Research Association reported: "This seems to be a nevoid growth in the mucous membrane, which is ulcerated in the centre and become consolidated with fibrin and exudation. The vascular channels in the deeper tissues are large and numerous."

The growth was removed by Frankel's forceps. There was now a small red swelling in the anterior part of the left vocal cord, but otherwise the larynx seemed to be normal. The voice was better than it had been for twenty years, and up to the present there had been no recurrence.

Mr. P. de Santi said that from the general appearance of the growth under the microscope there was, in his opinion, no doubt that it was a tumor of the nature of nevoid tissue, and that the

case was one of "pedunculated angioma." He understood that Dr. Bronner wanted to know if the Society agreed with his diagnosis.

Case of a Female Whose Saddle Nose had been Treated by Subcutaneous Injection of Vaseline (Paraffin) with Casts and Photographs Taken Before and After Treatment.

Shown by Dr. Scanes Spicer. The patient, aet. 25, had applied for treatment for nasal suppuration and fetor, which had lasted from childhood. There was a negative history as to traumatism or acquired syphilis, but some doubt as to evidences of congenital taint. She had a well-marked and tip-tilted saddle nose and stunting of the nasal framework. Crescentic wrinkles from eye to eye over the bridge of the nose were well marked, as seen in Cast No. 1, taken the day before injection (May 6, 1901). In addition to ordinary methods of treatment for nasal suppuration, the speaker suggested improving the shape of her nose by injecting sterilized vaselin as first described by Gersuny of Vienna. He had obtained the result indicated by Cast No. 2 and Photo. No. 2 (taken end of July, 1901).

The paraffin used was a mixture of hard and soft paraffin made to meet at 40° C. (105° F.), previously sterilized and kept in sealed bottles. The skin of the nose, etc., was cleansed first with alcohol and then with Liq. Hydrarg. Perchlor. The syringe and needle were cleansed and boiled in the sterilizer, which was also used as a water bath to heat the paraffin. A German glass hypodermic syringe was used, like that for injecting tuberculin. Ten to twelve syringefuls were injected, some downwards over nasal bends, some upwards from the sides of the nose into the depressed gap, and the injected matter was moulded by an assistant's fingers so as to shape the part before setting. The skin was again cleaned and the points of injection sealed up with collodion. The syringe was removed for refilling from the socket in the needle, which, when once in situ, was allowed to remain there until it was judged that enough vaselin had been injected at that spot. There was no pain, though the nose looked a little tense and brawny. No paraffin passed into the eyelids apparently at the time. There was afterwards no pain nor inflammation, but in a few days the upper eyelids became somewhat edematous. This had varied in amount from day to day ever since, and in left upper eyelid was a little nodule the size of a

large shot. This had been cut down on, but it did not appear possible to get it out.

The result, as far as the appearance of the nose went, was very palpable, the skin over the bony bridge of the nose being bolstered up, produced a very decent-sized organ. As it was done eight months ago, it might be regarded, as far as could be seen at present, as permanent. It was certainly a great improvement to her appearance, and the patient states that her mother was "proud of her in her altered condition." The patient indeed alleged that there had been an improvement in her general health and nasal suppuration since, but that was doubtless due to the general tonics and nasal washes she had used. The passage of a nodule of paraffin into the upper eyelid was disappointing, and so was the edema of the lids. The former was not improbably due to the physiological action of the pyramidalis nasi, which would tend to shift movable bodies upwards and into the orbit. The latter might be due to a blockage of lymphatic vessels by the paraffin, some of which had probably got divided up into a molecular condition. It should be remarked, however, that the upper lids were inclined to be puffy before injection. There was no edema elsewhere in the body. In any future case Dr. Spicer thought still more care should be taken to put pressure on the root of the nose at time of injection, and he suggested that repeated injections of smaller quantities would in all probability be better than doing all at once. The method appeared to offer many advantages over plastic operations for this class of case. Gersuny injected cocaine before injecting the vaselin, but this, he thought, could be hardly necessary in nasal cases, as the only pain was the prick of the needle. In some of his cases of filling up cavities or formation of an artificial protuberance the effect produced by the vaselin had remained unaltered in shape or size for many months, the paraffin apparently having become encapsuled.

The President thought it a very interesting case, and would like to hear if anyone else had experience of the method. The paraffin injection seemed worth trying in such cases, provided precautions were taken to prevent the paraffin from running into neighboring parts.

M. P. de Santi suggested that in treating these cases a piece of lead sheeting should be applied over the parts adjacent to the root

of the nose, and firm pressure exerted on it during the injection of the paraffin. This method he had used successfully for removal of cirroid aneurysm of the scalp. Such a piece of lead, properly cut and shaped, and applied round the neighborhood of the root of the nose would, in his opinion, prevent the particular accident that had taken place in Dr. Scanes Spicer's case. If this were done he would also be in favor of not removing the lead for some little time after the operation. As he understood from Dr. Spicer that the infiltration into the eyelids had not taken place immediately after the injection of the paraffin, but some time afterwards, it would also be easy to keep up the pressure on the parts by means of the lead sheeting and bandaging. He congratulated Dr. Scanes Spicer on the fine nose he had made in this case.

Dr. Bronner inquired if the paraffin had always been as soft as it was at present. He thought that by pointing the syringe downwards one would get over the particular difficulty that had arisen in this case. In a case of his own, which was similar to this, the nose was very much harder than that of the patient they had just seen, and his own difficulty was that immediately the paraffin was injected it assumed a certain shape, and retained that shape to such an extent that one could not mould it. Two or three weeks after the operation, in his own case, some inflammation set in. There was no pus, but the nose became red; in a few days, however, it settled down again to its normal state.

Dr. Milligan asked what kind of paraffin had been used by Dr. Scanes Spicer, and what the temperature at which it had been injected. It evidently was a very mobile paraffin.

Dr. Lambert Lack thought it might be possible to raise the skin and make a small cavity into which to inject the paraffin, instead of injecting it at random into the subcutaneous tissues. He thought the result in Dr. Spicer's case was excellent.

Dr. Donelan said that with regard to preventing the rapid cooling of the paraffin, it might be possible to model a series of noses varying from the most aristocratic and refined to the most vulgar in type, and have them made on the principle of the Leiter's coil, with a double chamber, so that the temperature might be maintained at that of the injection, and the nose given any desired shape.

In reply, Dr. Scanes Spicer said that he put the bottle containing

the paraffin and the syringe into a water bath and heated it till it was just mobile. Such a small quantity as was injected must very soon cool down to the body temperature. The paraffin described by Gersuny was described in the Austrian Pharmacopeia as unguentum paraffinum. It is said to melt at 40° C., i. e. 105° F. Rogers, of Oxford street, had prepared it for him (and from this firm it could always be obtained) in hermetically sealed bottles. He was very careful to ensure asepsis. There was not the slightest reaction of any kind after injection in his case. The nose was possibly a little tighter at first than it was now. About six drachms were required to form the "bolster."

With regard to Dr. Lack's remarks, he wished to say the paraffin was not injected "at random." The point of the syringe was put down where the chief part of the bolster was required, and then the paraffin was injected little by little and slowly, and the lump rose before one's eyes. But he thought that speaker's idea of first making an incision and then a kind of cavity with a blunt probe beneath the skin a very good one, and if he had another case he would cautiously try it. He feared, however, that bleeding might interfere with the operation. He tried to direct the shape of the bolster into that of a kind of omelette underneath the skin, between the skin of the nose and the bone. He had an assistant to help him while doing the operation, but the patient did not mind a bit, and did not even sit down for it.

Sequel to Case of Radical Cure of Multiple Suppurative Sinusitis and Polypoid Disease of the Nose. Previously exhibited April 10, 1895, and January 8, 1896.

Shown by Dr. Scanes Spicer. The patient, a male aet. 21, was first seen on November 4, 1893, suffering from bilateral nasal obstruction due to polypi, accompanied by profuse suppuration. These conditions he had had for several years, for which repeated forceps operations had been performed. Lately he had lost $1\frac{1}{2}$ stones in weight. Empyema of right antrum was indicated by symptoms, and corroborated by transillumination and by exploration through the canine fossa and irrigation. A day or two later the pus had collected near site of puncture and formed an abscess, which had burst into the mouth. The polypi were thoroughly removed, and also the anterior end of the right middle turbinated body and the polypoid masses about the ostium maxillare were

thoroughly curetted. The discharge continued profuse. Radical operation, as described by the speaker, was recommended and performed in St. Mary's Hospital on December 2, 1903. A two-ounce bottleful of polypi, granulations, and cholesteatomatous debris were removed. There was severe febrile reaction afterwards, which soon subsided, and patient left hospital in ten days, and gained in first week at home 7 pounds in weight. The polypi recurred and the nasal suppuration continued, though clearly not from the antrum, as when the patient blew through the antrum from nose to mouth or vice versa no pus was seen. Removal of polypi and bone and curettement of the ethmoidal lateral mass under cocaine were persisted in on and off until March, 1895, when the bone about the right frontal eminence appeared swollen, and the skin over it tinged with an erysipelatous blush the size of a shilling, together with considerable pain and malaise. He had been losing weight again, and there was evening pyrexia. Retention of pus was diagnosed in the right frontal sinus, and the left was possibly involved also, though in a less degree. There were both polypi and pus in the left nostril, which had been treated throughout the case; the antrum on this side was translucent. Operation was recommended, and the frontal sinuses were opened on March 23, 1895. The patient had a very deep natural median furrow on the brow, so this was used for a mid-line incision. A half-inch trephine was used and applied centrally, its progress being carefully tested with clean quills. As soon as the sinuses had been entered on either side the crown was levered up from its attachment to the septum between the sinuses and detached. At once a membranous sac containing gelatinous polypi and yellow pus sprang from each sinus into the wound. Both sinuses were now thoroughly curetted out, passages made freely into the nose with sharp spoons, the cavities swabbed out with chloride of zinc, and a rubber drainage-tube passed through each sinus out through the corresponding nostril, their ends tied loosely together, and the skin incision sewn up. Warm boracic irrigations were used both through the tubes and in the nose, and the tubes were slightly moved each day, and were finally removed about the tenth day. The patient was shown to the Society on April 10, and in the "Proceedings," Vol. II, page 74, is simply mentioned by name, as a case of antral empyema. The patient had gained eleven

pounds in weight since the operation seven days previously, and there was hardly any discharge, while the skin wound had closed.

The patient was shown again at the annual meeting on January 8, 1896, as an instance of a radical cure. There had been a gradual diminution of suppuration until it completely stopped, and no recurrence of it or the polypi had recurred for several months. The line of incision was almost invisible owing to the deep natural furrow.

During 1896 the patient entered the Army Medical Service and went to India on active work. He continued in the fullest enjoyment of health and energy till he injured his leg during prolonged riding on duty and developed phlebitis and thrombosis of the left saphena. On returning home in 1901 he was in St. Mary's Hospital. He then had not had any recurrence of polypus or nasal suppuration for over $5\frac{1}{2}$ years. Unfortunately, however, the phlebitis in the leg persisted with relapses until, on October 3, he was considered to have recovered and to be fit to return to duty. He returned to London from the country with that view, when he was seized with cerebral thrombosis, from which he died in three days.

Dr. Spicer considered the interesting points about the case were its long duration, extensive diffusion, and obstinacy of the intra-nasal disease. Before coming under his charge irrigations only had been used, and removal of the larger polypi with forceps. He underwent constantly repeated operations at his hands for over $1\frac{1}{2}$ years before the intra-nasal disease was finally eradicated, but in the end he was cured, and remained so for $5\frac{1}{2}$ years, dying of a quite independent affection. Further, there was a remarkable gain in weight after each of the larger operations. Lastly, this was one of the first cases of cured frontal sinus empyema to be demonstrated at the Laryngological Society of London, and although the notes had not yet appeared in the "Proceedings," he thought they were of sufficient interest now the case is finally concluded.

A Case of Bony Thickening Over and Polypi Within The Right Frontal Sinus in a Man aged 40; Operation; Recurrence of Bony Growth and Commencing Similar Symptoms on the Right Side of the Face.

Shown by Dr. Scanes Spicer. The patient was first seen on November 23, 1901. A month previously a swelling had appeared

over right frontal eminence with pain; the upper eyelid was edematous and the palpebral fissure almost closed. There was a long history of nasal catarrh. Trans-illumination of the sinuses showed the most marked relative blackness over the affected eyebrow, with unusual translucency elsewhere. Dr. Spicer diagnosed intrasinus disease with retention of fluid and distension of the anterior wall, and recommended exploration of the sinus. This was done, and it was found that the bone was unusually dense and thick, and a large amount of the diffuse osteoma was chiselled and gouged away. On reaching the sinus it was found to be filled with polypoid tissue; there was no communication with the opposite side. The sinus was gently curetted and washed out into the nose without difficulty and then packed with ribbon gauze, the end being brought out through the forehead wound and the latter sewn up. The gauze was removed on the fifth day, and the patient made an uninterrupted recovery and was about within the week. Later he returned with a new rounded bony swelling on the frontal bone on the same side, which was slightly tender, and on the left side the eyelid was edematous, and the palpebral fissure almost closed, and there was some ill-defined thickening of the left supra-orbital ridge. He said he had knocked himself there accidentally a few weeks before. He was ordered iodide of potassium gr. v, t.d.s., and directed to show himself in the beginning of the year.

It appeared to Dr. Spicer to be an unusual case. There was no history of rheumatism, gout, or any constitutional disease which might throw any light on the case. At the present date he has been taking the iodide for two months, the bony swellings had diminished, and the eyelids and palpebral fissures were both quite normal as well as the intra-nasal condition. The rapid diminution of symptoms under Pot. Iod. suggests "nodes" of a specific nature which, however, the extreme hardness of the bony tumor that was cut into would appear to negative, but opinions were invited as to the diagnosis of the case.

Specimen of Pharyngeal Lipoma.

Shown by Dr. Milligan. Mrs. H—, aet. 37, had suffered from her throat for from one to two years. She complained of slight dysphagia, a feeling of fullness in the throat and considerable amount of dyspnea when lying down. Her general health had also depreciated and she had lost a certain amount of weight. On

examination a large unilateral ovoid swelling was found under the mucous membrane of the posterior wall of the pharynx on the left side. The swelling extended upwards behind the level of the soft palate and downwards behind the larynx, where, indeed, the swelling was most prominent. To palpation the swelling appeared soft and doughy. There was no pain, no expectoration, and no temperature. Diagnosis lay between the possibility of a chronic abscess or lipomatous tumor. The fact that there was no indication of any bone disease present rather negated the idea of abscess. The patient was put under chloroform with the intention of removing the growth through the mouth, but it was deemed advisable, owing to its size and to the dyspnea from which she was suffering, during the chloroform anesthesia, to make a lateral incision and remove the growth from the outside. This was accordingly done and the growth was successfully removed. The patient made an uninterrupted recovery, and was rapidly regaining her health and her strength.

The President thought it a very interesting specimen.

Dr. Jobson Horne thought it would considerably add to the value of the communication if Dr. Milligan would allow the Society to have a section of the specimen. As the specimen was in a bottle it was difficult to express an opinion as to its nature.

Microscopic Section of Fibro-Sarcoma of Right Vocal Cord.

Shown by Dr. Milligan. H. C —, male, aet. 61, had suffered from his throat for six months. He complained of slight pain upon the right side, accompanied by progressive loss of voice. There was no expectoration, no loss of weight, and no history of any previous illness of any moment. When first seen there was slight congestion of the right vocal cord, but no appearance of any growth. When seen six months later the right vocal cord was found to be deeply congested, almost immobile, and growing from its upper surface, at about the junction of the middle with its posterior thirds, there was a smooth rounded reddish-looking growth about the size of an ordinary red marble. There were no enlarged glands. The rapidity of the growth, the almost complete fixation of the vocal cord, and the age of the patient made it probable that the growth was malignant. Its contour and its want of ulceration suggested a sarcomatous process. Immediate operation was advised. In the first place a tracheotomy was performed, and three

days later the larynx was split and the growth fully exposed. It was removed entirely along with a considerable amount of contiguous mucous membrane. An uninterrupted recovery ensued, and at the present time, now nearly twelve months since the operation, the patient was in excellent health and with no appearance of recurrence.

Microscopically the growth had the structure and characteristics of a fibro-sarcoma.

The following is the report from the Clinical Research Association:—"On the free surface the specimen submitted shows considerable activity, and has the structure of a sarcoma, composed in the main of spindle cells, but also showing round and branched cells. The central part of the tumor is composed of fairly well developed fibrous tissue. From the appearances presented I think the tumor should be regarded as a fibro-sarcoma. The epithelium covering the tumor shows active proliferation, and at the spot there is irregular down-growth. At this point it is a question whether some of the large cells seen are not to be regarded as epithelial." Mr. C. H. Wells adds to this report: "I think, on the whole, that they should be regarded as derived from the connective tissues and not from the epithelium overlying them."

Dr. Lambert Lack suggested that both the above specimens should be referred to the Morbid Growths Committee. He thought there was considerable doubt as to the diagnosis in both cases.

Dr. Milligan had not the least objection to the specimens being referred to the Morbid Growths Committee. With regard to the second, the piece shown was all he had, as the Clinical Research Association had not sent him back the remainder.

On the President putting the question to the Society, it was unanimously agreed to refer the two specimens—No. 5, specimen of lipoma of the pharynx, and No. 6, specimen of fibro-sarcoma of vocal cord—shown by Dr. Milligan to the Morbid Growths Committee for report and examination.

X-Ray Photograph Showing Plate of Teeth Impacted in Upper Laryngeal Orifice.

Shown by Dr. Milligan. M. C—, female, aet. 32, swallowed her teeth during sleep, the place of impaction being doubtful. The X-ray photograph now exhibited was taken, from which it would

be seen that the plate was lodged in the upper laryngeal orifice. By the help of a laryngoscope the plate was extracted, and the patient made a good recovery.

Dr. Milligan also showed an X-ray photograph of a rubber tube which had slipped into the maxillary antrum in a case which had been operated upon for chronic maxillary antrum suppuration, and one of an ordinary Eustachian catheter passed into the frontal sinus of a patient suffering from chronic suppurative frontal sinusitis.

Specimens of Papillomata of the Tonsil and of the Posterior Pillar

Shown by Dr. H. Sharman. The patient from whom these specimens were taken was a boy aet. 15, shown to the Society nearly four years ago, May 11, 1898, (see page 86, of vol. v, of "Proceedings").

He had a sessile papilloma of the left tonsil and a pedunculated papilloma of the left posterior pillar of the fauces.

After the patient had been shown the tonsils were removed and the pedunculated papilloma also.

A section of the left tonsil through the papilloma was cut by Dr. Hewlett, and also a section through the papilloma of the posterior pillar. Both were true papillomata, with finger-like processes covered with stratified epithelium.

The interest of the specimens was that they showed that the papilloma of the tonsil grew from the surface of the tonsil proper (not from the interior of a lacuna), and that it apparently lay quite behind and unconnected with the expansion from the anterior pillar known as the "plica triangularis."

The slides have been presented to the Society.

A Self-Looping Nasal Polypus Snare.

Shown by Mr. Atwood Thorne. This snare was made by Messrs. Meyer and Meltzer, and consists of a Y-shaped end-piece fitted on to the usual Krause snare. The two upper ends of the Y are joined by a slightly curved surface, and the polypus is caught between the wire and this surface.

The loop is tightened in the usual way by approximating the two finger plates. When the polypus is withdrawn from the nose by simply separating the finger plates, the loop is reformed without the usual fingering. As there is no knot or sharp twist in the wire, it has not the usual tendency to break.

In addition to its use for simple polypus, it is particularly adapted for the removal of moriform growths from the posterior end of the inferior turbinal, as the instrument can be passed with the loop retracted, and when in its right position the loop can be ejected, when it will take on any curve to which it has been previously bent.

The instrument can be used for the larynx as well as the nose.

Messrs. Meyer and Meltzer can supply the instrument complete or will make the addition to a Krause snare for a small sum.

Mr. Bennett thought the instrument very ingenious, but doubted whether its practical application would be very useful. He used snares made on the same principle, though less perfectly finished than Dr. Thorne's snare. The objection was that a wire coiled round a large surface did not cut through if the tissues were at all thick, and then one had to tear the polypus off. In all tough growths this defect would be found a serious one, for in such cases one would have to use considerable traction.

Mr. Atwood Thorne had just heard that a similar device had been shown in Berlin about a year ago, but this was news to him. In the cases in which he had used it the results had been very good.

A Case of Nasal Obstruction in a Woman aged 24.

Shown by Dr. Jobson Horne. The patient had recently come under observation on account of symptoms attributed to nasal obstruction. The history was that some six or seven years previously she had suffered in a similar way, and had had the inferior turbinated bodies removed. An examination of the nose showed that the inferior meatus was very roomy, and there was evidence of a "spoke-shaving" operation having been performed, probably some years before. The middle turbinated bodies on both sides were hypertrophied and the middle meatus obstructed. The tonsils were somewhat enlarged, and there was hypertrophy of the adenoid tissue on the post-nasal space.

Dr. Jobson Horne brought the case forward with reference to two points. In the first place, the spacious inferior meatus with free expiration, and the occluded middle meatus with obstructed inspiration, supported the observations recently made by Mr. Parker ("Journal of Laryngology, Rhinol., and Otol." Vol. XVI, page 345), on the directions of the air currents in the nose; namely, that the current of inspired air passed upwards and backwards through the middle and superior meatus, entirely missing the

inferior meatus, and that the current of expired air passed chiefly through the inferior meatus.

In the second place, the hypertrophy of the mucous membrane covering the middle turbinated bodies, for if so, whatever the immediate result might be from inferior turbinectomy with a view to reducing inspiratory obstruction, the ultimate result might be the reverse to that anticipated, and most disappointing.

Dr. Herbert Tilley was very interested in the case, because he believed the nasal obstruction to be due, not to any of the intranasal structures, but to collapse of the alae nasi. On asking the patient to breathe without a speculum in the nostrils, the alae nasi on inspiration were both sucked in, and on expiration a considerable nose was made. But directly a speculum was inverted the patient breathed quite freely and noiselessly. Under these circumstances he considered that to carry out any operative treatment inside the nose would be both unjustifiable and unscientific. The possible and probable explanation of the condition was that as a child the patient suffered from adenoids or some form of nasal obstruction, and as a result of disuse the soft parts at the entrance of the nostrils had not developed, with the result which was evident in the case exhibited.

Dr. Bennett said there was another interpretation of the obstruction beside that given by Dr. Tilley. In most patients a sense of greater freedom was given when a speculum was inserted into the anterior nares. In this particular case the obstruction was not so much a real obstruction as a subjective obstruction. The patient stated that the right side was fairly free, but that the left side seemed blocked. Careful inspection showed that the anterior part of the left middle turbinal was in contact with the septum. Such contact often gives rise to a sense of obstruction. It can be cured by treatment which prevents this contact. In some cases this can be effected by the galvano-cautery, but the best method is to snare off a little of the redundant tissue on the inner side of the turbinal body. It is unnecessary to remove any bony tissue. He had come to the conclusion that it was very important in such cases to carefully distinguish between what might be termed objective and subjective obstruction.

Dr. Scanes Spicer was glad to hear Dr. Tilley's remarks in reference to the collapse of the alae and the nasal vestibule as a

factor in obstruction. He did not remember to have heard any special reference at this Society's meetings made to this, and yet, in his opinion, a great deal could be done for that factor in many cases of obstruction. What was wanted in this case was to secure efficient action of the dilatores alae nasi so as to lift away the alae on inspiration. In many cases this could be effected by conscious education of those muscles by assiduous practice. In some of these cases this was much facilitated by a good stretching of the soft tissues of the alae nasi, with a Hill's dilator. This should be followed up by systematic lubrication of the nostrils, and the wearing at night of a support such as the celluloid nasal springs, or little pieces of red rubber tubing of the largest calibre the nostril could accommodate and as shallow as possible. Physical exercises also were adopted, which had the object of re-establishing the normal co-ordinated action between the alae muscles and the other inspiratory muscles. He had obtained markedly good results in many of his own cases, and he did not think this matter had been brought forward as prominently as its relative importance and efficiency demanded, though he had no doubt many members used these measures. It was, however, undoubtedly true that in a large proportion of cases the alar stenosis element was ignored.

Dr. Burt had seen a similar case, and did not think operative interference would be of any use. By putting in a tube to force the alae nasi to work well, some relief might be given. It was the only way in which he had been able to give relief in a case of his own, where the inferior turbinate body had been removed for some obstruction and the alae nasi had collapsed. He did not think for a moment from his experience that mechanical dilatation would give permanent relief, for if the dilator were removed the alae would soon fall in again.

Dr. P. McBride asked Dr. Spicer in what way he thought that forcible dilatation of the alae could possibly affect the collapse. As far as he understood the cause, the collapse was due to paresis and resulting flaccidity; how, then, could stretching of the alae possibly permanently enlarge the opening? He absolutely failed to see how it could be done. He was quite aware that Moritz Schmidt had written on the subject, and had come to the conclusion, after considerable experience, that mechanical dilatation, as accomplished by wearing a Feldbausch dilator, made the patients more

comfortable, but he was unable to see how forcible stretching could permanently affect a condition of this kind.

Dr. Scanes Spicer asked Dr. McBride what he desired to infer by the term paralysis in these cases.

Dr. McBride said there was a dilator nasi, and he presumed the term "paresis," as applied to these cases, stood for paresis of the dilator nasi. He asked if after these measures described by Dr. Spicer patency was restored. What was the permanent outcome?

Dr. Scanes Spicer could not admit a "paralysis" in the true sense from nerve lesion. He thought that from long continued disuse (1) the alar muscles were weakened and paretic; (2) that the soft tissues of the alae were stiff, rigid, and often contracted, and that the weakened muscles were unable to drag out the stiff tissues, especially when the action of the inspiratory air current led to a fall of atmospheric pressure in the nose; then the external atmospheric pressure drove in the alae. He would therefore describe the condition as one of functional paresis of dilators from disuse, combined with a stiffness or rigidity of cellular tissues from disuse, similar to what occurred in an over-rested joint. He would therefore suggest, as an explanation of forcible stretching of the alae, that the resistance against which the muscles worked was lessened, and they would overcome this lessened resistance in the same way that, after a stiff joint had been mobilized under anaesthesia, it could be moved after by its own muscles, and these could again recover good power by practice. It had happened to him several times that in the course of an operation under anaesthesia for complex intra- and post-nasal stenosis, he had ended up with dilating the alae if collapsed and rigid, when immediately they began to resume their normal inspiratory rhythm, which was kept up afterwards by practice and tube supports.

Dr. McBride thought it would be most interesting if Dr. Scanes Spicer would show to the Society a case in which there was a collapse and in which this "mechanical dilatation" treatment had been tried, so that they could see if it was cured by that method.

Dr. Pegler said that with regard to the question raised by Dr. Jobson Horne as to whether in this case the middle turbinates were compensatorily hypertrophied, he did not think that these bodies were liable to this change. Here there was no hypertrophy of the left middle turbinate, but the right one showed signs of disease.

Dr. Mulligan asked if there were any observations in the literature of the subject on what the paresis of the dilators was really due to. Had any microscopic examination of the muscle been made? If there was really an atrophy of the muscle, dilatation such as described could not have any possible value. If the muscle was atrophied, and it was dilated, would not the cicatricial contraction tend to narrow still more the vestibule of the nose? He was not aware of any observations having been made on the subject, but it was certainly one which might with advantage be investigated.

Dr. Jobson Horne, in reply, said he was glad to have heard so many suggestions and remarks; at the same time, it was a little difficult for him to accept the theory put forward by Dr. Tilley, attributing the obstruction to collapse of the alae nasi. Dr. Horne said he was of the same opinion as Dr. Bennett in that the respiratory obstruction was caused by enlargement of the middle turbinated bodies and consequently narrowing of the meatus. He had brought the case forward mainly with reference to the two points stated in his opening remarks, but inasmuch as the treatment had been discussed he would mention that the patient had shown signs of commencing myxedema, and had been taking extract of thyroid gland with beneficial results and subsidence of nasal symptoms. The case was therefore of value in illustrating the advisability of looking further afield for a cause in some cases of nasal obstruction, and of not over-looking the possibility of commencing myxedema. He had no intention of suggesting further surgical treatment of the nose.

A Case of Syphilitic Laryngitis in a Man aged 52.

Shown by Dr. Donelan. The case had been brought before the Society on a previous occasion, since which he had been energetically treated by anti-syphilitic remedies, but though there had been improvement during the first few weeks, latterly the ulceration appeared to be spreading. The fixation of the left vocal cord was more marked than before, and he thought there was now evidence of malignancy, but desired the opinion of members.

M. de Santi thought it would be advisable to remove a piece of the growth and examine it microscopically. He thought it of a malignant nature. It certainly seemed to him to have altered a good deal since he last saw the case, there being greater thicken-

ing, ulceration, and fixity. But to clear up the diagnosis, recourse should be had to the microscope, and the case dealt with accordingly.

Dr. Donelan would endeavor to carry out the suggestions made by Mr. de Santi.

**Case of Very Extensive Destruction of the Interior of the Nose,
Due to Tubercular Ulceration, in a Woman aged 31.**

Shown by Mr. de Santi. The patient had been married seven years and had had one miscarriage. There was no history of acquired or congenital syphilis, and nothing to corroborate any such condition, except the state of the nose. For some four years the woman had suffered from chest trouble and hemoptysis, and for three years she had been suffering from disease of the nose and larynx. There were well-marked physical signs of phthisis in both lungs, abundant tubercle bacilli in the sputum, and the larynx showed tubercular disease with ulceration. The main point of interest in the case was the very extensive destruction of the nasal cavities; the whole of the bony and cartilaginous septum had disappeared, and the greater part also of the turbinals; there was consequently great external deformity, due to falling in of the bridge of the nose. There was still active ulceration going on in the nasal cavities and tubercular ulceration of the larynx.

Mr. de Santi had never seen such extensive destruction of the nasal cavities follow on tubercular infection, and although there was no doubt about the tubercular nature of the case he considered there was a strong suspicion that syphilis played some part in the causation, in fact, that the case was one of mixed infection. As bearing on this question of syphilis, one could see on looking at the pharynx that there was a fenestra in the posterior pillar of the fauces on the left side; this was suggestive of syphilitic ulceration. Treatment so far had been entirely of an anti-tubercular character, and had been fairly successful in keeping the lungs and larynx from a rapid advance of the disease. He, however, now proposed to try anti-specific treatment as well.

The President asked if the sphenoidal sinuses had been investigated. He understood there was no doubt as to the tuberculous nature of the case, but something else besides tuberculosis seemed required to produce the deformity, e. g. syphilis. Accessory sinus disease might also be present.

Dr. FitzGerald Powell thought the patient was undoubtedly suffering from tertiary syphilis. He thought that there was not any appearance typical of tuberculosis. In reply to Mr. de Santi he said he had looked into the larynx, which appeared to him (from what was necessarily a cursory examination) to be the seat of syphilitic disease. With regard to the nose, he was quite convinced that the extensive destruction of the soft tissues and bone was the result of syphilitic ulceration. The same remark applied to the large perforation in the faucial pillar. Notwithstanding the fact that tubercle bacilli had been found in the nose, and that there was said to be tubercular disease in the lungs, he maintained that the extensive destruction of the nasal tissues was due to syphilis. This case presented very different appearances to cases of mixed disease he had observed, and some of which he had shown at a former meeting of this Society.

Mr. de Santi, in reply to the President, said he had not examined the sphenoidal sinuses. He adhered to his decision that the case was a tubercular condition; but he also considered it almost certain that a mixed infection of syphilis and tubercle existed, for he himself had never seen such extensive destruction of the interior of the nose from tubercular disease alone.

Case of Ulceration of the Nasal Septum with Marked Pain.

Shown by Dr. Bennett. Miss H—, aet. 22, came first under observation in 1898. She was pale, tired, overworked, and suffering from frequent gastralgia.

The right nostril was obstructed. The septum of the nose was perforated, causing whistling respiration, and there was a good deal of tenacious muco-purulent secretion in the naso-pharynx. There was marked pain in the nose, and especially high up on the right side, where the tissues were considerably swollen.

The pain and swelling gradually increased. Incision of the swollen tissues and the application of ice during a period of several days did little good. Soothing antiseptic ointments, calomel fumigations, tonics, iodides, etc., were tried, but all without good result.

In July, 1898, the swelling became very great and the pain intense, so under ether some of the middle turbinal tissue was removed and the septum curetted. For a few weeks there was slight relief. The removed tissues were examined on more than one occasion, but no light was thrown on the cause of the ulceration.

During the last two years there had been gradual extension of the ulceration until nearly all the cartilaginous septum had been destroyed. There had been frequent small and occasional severe hemorrhages. The pain had apparently been very severe on one or other side, and often it had been accompanied by redness of the side of the nose. The swelling of the septum had been very great, and it must have attained a thickness of about one inch.

In March, 1901, she consulted Mr. Bond, who advised removal of middle turbinal tissue so as to prevent the pain caused by the pressure of the swollen tissue. In June I removed more of the middle turbinals, and freely curetted the septal swelling.

Although there is relief as regards the nasal obstruction, the pain still remains as severe as before.

Dr. Tilley said that the antra on both sides should be explored. From the right antrum at about the position of ostium, there was a small trail of yellow pus coming down. If there were pus in the antra, as he thought possible, he felt sure that their drainage would effect a considerable improvement in the condition of the nose. He had recently seen in consultation the case of a lady addicted to the cocaine habit, and who, under the influence of that drug, had picked away the whole of the cartilaginous septum, so that the combined nasal cavities were covered with a thin veneer of dried mucus and scabs producing an appearance identical with that showed by Dr. Bennett.

Dr. Dundas Grant considered it a tuberculous condition of the septum. It might be lupus. It was too extensive for any form of simple perforating ulcer.

Dr. Scanes Spicer asked whether the ulceration commenced on the cartilage or on the bone. If the former he thought it was lupus, if the latter, syphilis. He had had a similar case, and showed it at the Society some three years ago. It had remained practically the same.

Dr. Milligan thought it might be traumatic and the result of picking the nose followed by extensive ulceration. Was there any history to corroborate this view?

Dr. Lambert Lack suggested it might be a case of syphilis. He had never seen sinus suppuration cause a progressive destruction of the septum, whilst in cases of nasal syphilis, sinus suppuration was often seen.

Dr. Bennett, in reply, said there was no disease of the ethmoidal or sphenoidal sinuses, and he should be astonished if the antra proved to be affected.

BIBLIOGRAPHY.

It is our purpose to furnish in this Department a complete and reliable record of the world's current literature of Rhinology, Laryngology and Otology.

All papers marked (*) will be published in abstract in THE LARYNGOSCOPE.

Authors noting an omission of their papers will confer a favor by informing the Editor.

I. NOSE AND NASO-PHARYNX.

On the Presence of Hyaline Bodies in the Hypertrophied Mucosa of Inferior Turbinate and its Significance. CITELLI. *Arch. Ital. di Otol. Rinol. e Laring.* January, 1902.

Enlargement at Root of Nose due to Polyps in Nasal Fossa. LICHTWITZ. *Arch. Internat. de Laryn. d'Otol. et de Rhin.* Paris, 1901. XIV, p. 400.

Two Cases of Imperforate Right Nasal Fossa. BOULAI. *Arch. Internat. de Laryn. d'Otol. et de Rhin.* Paris, 1901. XIV, p. 407.

Fatal Nasal Hemorrhage. GUTMAN (M.). *Vrach. Gaz.*, St. Petersburg, 1901. VIII, p. 1033.

Nose and Throat Work for the General Practitioner. GEO. L. RICHARDS, (Fall River, Mass.). *Internat. Jour. Surg.* Feb. 1902.

***Reduction of Nasal Obstruction with London Paste.** A. C. ROGERS, (Los Angeles). *South. Calif. Practit.* Feb. 1902.

***Rhino-Pharyngitis and Chronic Tonsillitis and their Sequelae in Children.** G. DUPOND. *Revue Heb. de Laryng. D'Otol. Rhinology.* Jan. 25, 1902.

The Vibratory Treatment of Ozaena. COLOMBO. *Arch. Ital. di Otol. Rinol. e Laringol.* Jan. 1902.

II. MOUTH AND PHARYNX.

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IV. LARYNX AND TRACHEA.

Laryngeal Tuberculosis and Pregnancy. KUTTNER. *Arch. Ital. di Otol., Rinol. e Laring.* Jan. 1902.

A Study of the Structure of Laryngeal Mucosa in Man. CITELLI. *Arch. Ital. di Laring.* Napoli, 1901. XXI, p. 15.

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***An Artificial Larynx.** G. T. HANKINS, (Sydney, Aus.) *Australas. Med. Gaz.* Jan. 20, 1902.

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Acute Infectious Submucous Laryngitis. A. ONODI. *Revue Heb. de Laryng., d'Otol. Rhin.* Jan. 25, 1902.

Tuberculosis of the Larynx in Infancy. MAURICE PERRIN. *Revue Heb. de Laryng., d'Otol. Rhin.* Jan. 18, 1902.

V. DIPHTHERIA, THYROID GLAND, ESOPHAGUS, ETC.

Diphtheria and Its Treatment. T. B. JOHNSON, (Frederick, Md.) *Medicus.* Jan. 1902.

VI. EAR.

Remarks Upon the So-called Musical Ear. R. CECCA. *Arch. Ital. di d'Otol. Rinol. e Laringol.* Jan. 1902.

Two Cases of Foreign Body in Auditory Canal. TOUBERT. *Arch. Internat. de Laryng., d'Otol. et de Rhin.* Paris, 1901. XIV, p. 394.

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Case of Multiplication of Worms in the Middle Ear. EFROSS, (G.). *Feldsher.* St. Petersburg, 1901. XI, 615.

A Case of Otorrhoea in the Course of a Case of Typhoid Fever. A. RAOULT ET SPECKER. *Revue Heb. Laryng., d'Otol. Rhin.* Feb. 1, 1902.

A Case of Otitis Pyaemia without Phlebitis. THOMAS. *Revue Heb. Laryng., d'Otol. Rhin.* Jan. 11, 1902.

Crossed Paralysis of Auditory Nerve. GELLE. *Arch. Intern. de Laryng., d'Otol. et de Rhin.* Paris, 1901. XIV, p. 385.

VII. MASTOID AND CEREBRAL COMPLICATIONS.

Difficulties in Diagnosis of Certain Cerebral Complication of Otitic Origin. CHAVASSE. *La Parole.* Paris, Jan., 1902.

Necroses of Mastoid Process Consecutive to an Acute Otitis. ROYET. *La Parole.* Paris, Jan., 1902.

Indications for Trephining the Mastoid Process in Acute Inflammations. LYURI, (S. A.) *Voenno Med. J.* St. Petersburg, 1901. LXXIX, 2d pt., 2328-2356.

VIII. THERAPY.

Mentorol in the Treatment of Tuberculosis of the Larynx. CYBULSKI, (H.). *Gaz. Lek.* Warszawa, 1901, 2 s. XXI, 868-874.

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Camphoroxol and Menthoxol in Suppuration of the Middle Ear. A. E. PHELAN, (San Francisco). *Occident. Med. Times.* Feb. 1902.

IX. NEW INSTRUMENTS.

Apropos of an Instrument for Radical Operation in Chronic Maxillary Sinusitis by the Caldwell-Luc Method. GAVELLO, *Arch. Ital. di. Otol., Rinol. e Laringol.* Jan. 1902.

X. MISCELLANEOUS.

Value of Eustachian Catheterization and of Oxygen under Pressure in the Cure of Catarrhal Otitis. FERRERI. *Arch. Ital. di. Otol. Rin. e Laring.* Jan., 1902.

Methodical Acoustic Exercises in Deaf-mutism. URBANTSCHITSCH. *La Parole.* Paris, Jan. 1902. p. 29-56.

Case of Jacksonian Epilepsy Resulting from an Ear Affection. CHAMPEUX. *Arch. Internat. de Laryn., d'Otol. et de Rhin.* Paris, 1901. XIV, 403.

Examination of the Hearing, Nose, and Nasopharynx of the Pupils of the St. Petersburg School for Deaf-mutes. GELLAT, (P. P.). *Vrach. Gaz.*, St. Petersburg, 1901. VIII, 823; 847; 866.

Departments of Immediate Surgery. Pt. 2, Diseases and Injuries of the Neck. CHUGAYEFF, (A.) VIII, 544 pp., 8v. St. Petersburg, 1901.

Compact Lipoma in the Pharyngo-Laryngeal Cavity; Subhyoid Pharyngotomy. POROSHIN, (N. N.). *Vrach, St. Petersburg.*, 1901. XXII, 1475.

BOOK REVIEWS.

The Eye, Ear, Nose and Throat Year Book, being Vol. III of The Practical Medicine Series. Edited by DR. G. P. HEAD, with the collaboration of Drs. Casey A. Wood, Albert H. Andrews and T. Melville Hardie. THE YEAR BOOK PUBLISHERS, 40 Dearborn St., Chicago, Dec., 1901.

Every progressive worker interested in our special literature should be pleased to carefully and critically scan the pages of this Year Book. After two years previous experience, the editors now have this work well in hand, and we note a constant improvement in the selection of the subject matter, and in the terseness with which it is presented.

We are sorry to note that the quality of the paper and the appearance of illustrations and press work is not quite up to the standard of previous volumes.

M. A. G.

The American Year-Book of Medicine and Surgery for 1902. (Surgery.) A yearly Digest of Scientific Progress and Authoritative Opinion in all branches of Medicine and Surgery, drawn from journals, monographs, and text-books of the leading American and foreign authors and investigators. Arranged, with critical editorial comments, by eminent American specialists, under the editorial charge of GEORGE M. GOULD, A.M., M.D. In two volumes—Volume I, including *General Medicine*, Octavo, 700 pages, illustrated; Volume II, *General Surgery*, Octavo, 684 pages, illustrated. Philadelphia and London: W. B. SAUNDERS & Co. 1902. Per volume: Cloth, \$3.00 net; Half Morocco, \$3.75 net.

The contents of this volume, critically selected from leading journals, monographs, and text-books, is much more than a compilation of data. The extracts are carefully edited and commented upon by eminent specialists, the reader thus obtaining a yearly digest of scientific progress and authoritative opinion in all branches of medicine and surgery. As usual, this issue of the Year-Book is not lacking in its illustrative feature, for besides a large number of text-cuts, the Surgery volume contains five full-page inserts. In every way the Year-Book of 1902 fully upholds, if it does not strengthen, the reputation won by its predecessors.

Last season there was a noticeable incompleteness of the chapter on Otology, and we specially indicated that the editor of this section failed to make any reference whatever to THE LARYNGOSCOPE. In the present volume there is a conspicuous absence of American literature in this chapter, and with the exception of one special journal, no reference to any other American medical journal whatsoever is made. It appears decidedly inconsistent that in a volume known as The American Year-Book, the chapter on Otology should be made up almost entirely of references from foreign authors and foreign journals.

In decided contrast to this, must be mentioned the chapter on diseases of the Nose and Larynx, which is distinctly and essentially an able, brief, annual review of the American literature of this field; and while frequent references are made to authors and journals abroad, every consideration is accorded our own progressive confreres.

M. A. G.

ABSTRACTS.

Some Details in Eustachian Catheterization.—DUNDAS GRANT (London)—*Journ. of Laryng.*, Sept. 1901.

The author emphasizes the importance of a rhinoscopic examination before an attempt is made to introduce the catheter. Cocain in the form of spray or application lessens the patient's sensitiveness and facilitates manipulation.

Numerous suggestions are offered in cases where nasal obstruction exists. The use of the nasal speculum will assist the operator materially.

M. D. LÆDERMAN.

Nasal Prosthesis by Means of Injections of Solid Paraffine According to the Method of Eckstein.—BRÜCKERT—*Revue Heb. domadaire de Laryngologie, D'Otologie et de Rhinologie*, Dec. 7, 1901.

The author believes this method an important addition to modern surgery. The complications which have thus far been reported, such as two cases of pulmonary emboli, one by Pfannensteil 2, of Breslau, and the other by Halban 3, of Vienna, will probably be avoided by modifications in the composition, or by raising its melting point.

The advantage of paraffine over vaseline is that it is not absorbed, especially if rapid solidification is insured according to the method of Eckstein. A capsule of connective tissue is gradually formed, which prevents absorption.

The author reports two cases of saddle-back nose and one case of epicanthus, which were treated by means of injections of paraffine with permanently good results.

W. SCHEPPEGRELL.

A Criticism on Certain Aural Methods, Formulæ, and Diagnosis.—E. W. PYLE—*N. Y. Eye and Ear Infirmary Reports*, Jan. 1901.

The essential demand of this paper is for prophylaxis, the author admitting the intractableness of well established or chronic disease of the ear, with organic chancre. More attention should be paid to this feature of dispensary service, and more efficient home treatment secured. Hence, a chair of instruction for the propagation of prophylactic knowledge, in the treatment of the simpler conditions of disease (douche, syringe and general hygiene) should be established in every dispensary. The author details his methods of using the accessories and is explicit in his description of his ideas and methods in the treatment of tubal catarrh, the indications for instillations, post-auricular abscess, and the several conditions included under the acute inflammatory processes.

F. C. E.

